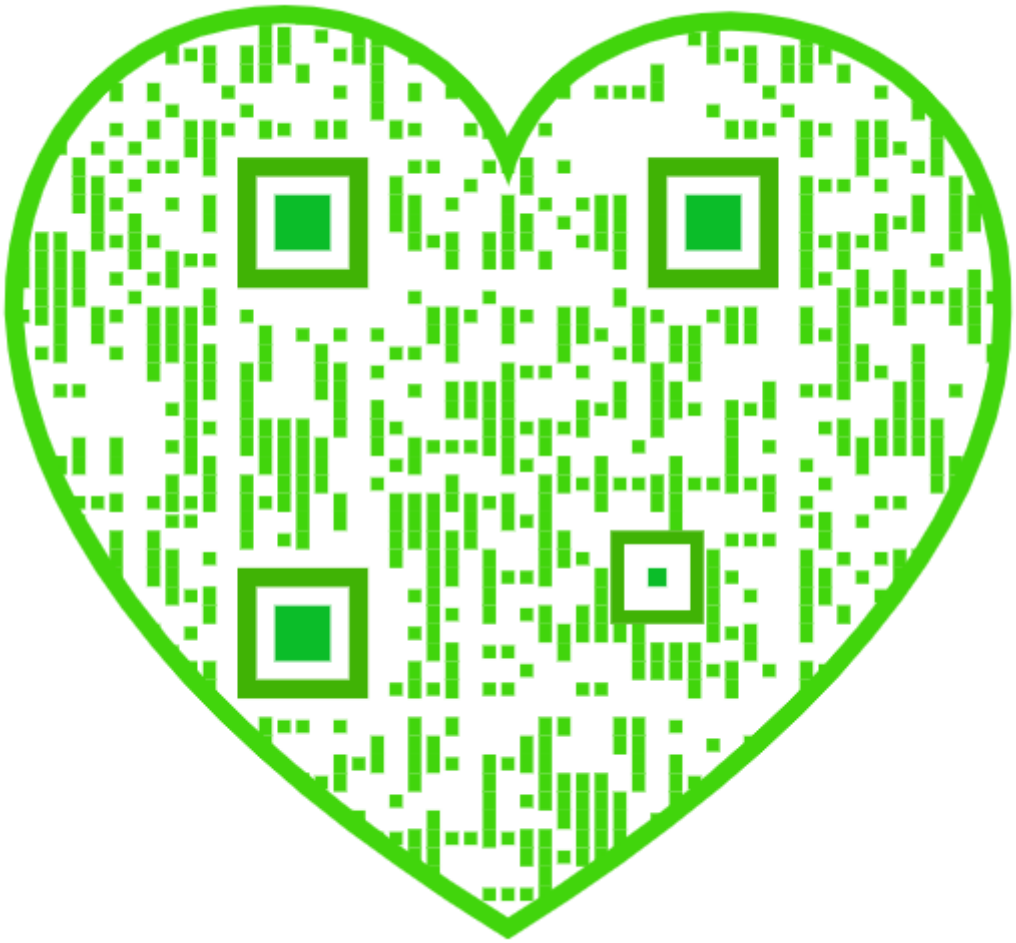

RATIONAL

ELEMENTARY ARITHMETIC

BY

H. H. BELFIELD, A.M., PH. D.

DIRECTOR OF THE CHICAGO MANUAL TRAINING SCHOOL

AND

SARAH C. BROOKS

SUPERVISOR OF PRIMARY GRADES, ST. PAUL, MINNESOTA

DEPARTMENT OF EDUCATION
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PREFACE.

The product of the latest thought in number teaching is fairly represented in the writings of Commissioner W. T. Harris, in the reports of the Committee of Ten and the Committee of Fifteen, and in McLellan and Dewey's "Psychology of Number." The attempt to make a book in which the theory of these educators shall be wrought into a practical scheme of instruction may well call forth the greatest skill and most serious efforts of any author. To this task the writers of this book have set their hands, and the teaching public must say how well they have succeeded.

ORDER OF DEVELOPMENT.

The arrangement of the number work for the elementary grades should be determined by the order of the child's mental development rather than by the logic of the subject itself. This requires a progressive arrangement of all material, thereby securing a proper sequence of processes, and a careful grading of exercises. The young child is more susceptible to likenesses than to differences. His judgments and classifications are therefore hasty and inexact. Before he can make sharp distinctions, he must first have the means at hand to observe, and guidance in forming approximate judgments of length, width, and size of objects contrasted and compared. Froebel lays great stress upon this phase of early training. He says: "Every external object comes to man with the invitation to determine its nature and relationships, and everything comes to be known only as it is connected with the opposite of its kind. The first law of all phenomena is the law of opposites or contrast."

The use of color in the lines and squares in the early part of this book is for assistance in this work of comparison and

contrast. Pages 7 to 11 provide for this early indefinite comparison, and also suggest other varieties of the same kind of work.

MATERIAL. The idea of number and of numerical operations should be acquired from the concrete. Dr. Harris in the introduction to the "Psychology of Number" says, "The first lessons in arithmetic should be based on the practice of measuring in its varied applications." The Committee of Ten says, "The fundamental operations of arithmetic should not only be performed symbolically by numbers, but practically by joining lines together, dividing them, etc." This appeal to the concrete involves the use of certain materials, and any successful book based on this method of instruction must provide these in the book itself. This the RATIONAL ARITHMETIC does in great variety: *e. g.*, colored lines and squares; the various schemes for graphic illustration and for number combinations,—such as the multiplication tables on pages 64, 107, etc.; the construction of figures for linear and square measure on pages 101, 120, etc.; the visual presentation of fractions on pages 178, 250, etc. By means of these the child is also trained to make use of other material which will aid him in grasping the principles involved.

THE UNIT. In this book the early presentation of number is made by the use of the quantitative, and therefore definite, unit, as against the qualitative unit, or individual. That is, the use of lines, of inch, cent, pint, pound, is not like the use of toothpicks, a mere assembling of individual things, but a measuring of quantities; and number is essentially a development of quantity. For example, by joining lines together the child learns that four is equal to four ones, three and one or one and three, and two and two or two twos. Moreover, the child learns that one is one-fourth of four, and that two are one-half of four, thus learning his fractions along with his integers. The child learns these facts by joining lines together; that is, he not only learns the facts from the book, but he knows them as a result of actual experiment. At first all the lines or surfaces used should be actual measurements, so that the

child will learn by observation to apply at sight the information which he first acquires. This measuring of lines bears the same relation to the kind of work usually given that the laboratory experiment bears to the lecture. The boy, not the teacher, joins the lines together for the same reason that the student performs his experiment in physics for himself.

He is next led to apply his facts to other concrete problems, such as: If John has one marble and Henry has three, how many have both? which are not constructive, but which oblige him to use his judgment. Finally the number combinations thus learned and applied are fixed by a series of drills. An essential feature of these drill tables is that they make the subject less formidable to the child. For example, the tables on page 43 show that if the child adds three, say, to a series of numbers ending in six, all the sums will end in nine. As soon as the child masters the development of a number, he is taught to associate it with certain facts of his daily life; as, for example, in connection with the number eight, is given the table of dry measure, and with the number twelve, the foot, the months, and the mysteries of the clock face. In this way the child is sure to be interested, and his powers both of memory and of judgment are developed. Throughout the book much use is made of graphic illustrations and concrete problems, such as drawing to scale.

PROBLEMS. The problems from beginning to end deal with realities, and appeal so far as possible to the child's environment or experience. This gives to the work an interest which cannot otherwise be secured, and cultivates the power of observation and the application of numbers to every-day objects and experiences.

The order of treatment in every new subject, so far as possible, has been, first, to give the concrete form which will present the principle; second, to give the abstract principle or law which has been illustrated; and lastly, to make various applications of this principle in a series of problems that will fix the knowledge of number relations definitely in the child's mind.

The authors desire to make special acknowledgment of their indebtedness to the many superintendents, principals, and teachers who have assisted in the perfection of the book by suggestions and corrections both in the manuscript and proofs.

THE AUTHORS

INTRODUCTION FOR TEACHERS

PREFATORY. Since most children will know many of the number facts found in this book up to page 49, the teacher must adapt the uses of these pages to the needs of his pupils. If they have but little knowledge of the simplest combinations up to 12, then they should study the first part of the book very slowly and carefully until these number facts are thoroughly fixed in mind. If, on the other hand, they are familiar with most or all of the combinations of these 49 pages, they need only review them rapidly, laying stress upon the construction and the acquiring of facility in the number combinations, such as those on pages 15, 23, 35, 41, 43, etc.

COMPARISON. The work from pages 7 to 11 supplies material for a great variety of indefinite comparisons, designating the objects by color. From these exercises will come the power to apply readily and intelligently the terms *longer, shorter; larger, smaller; higher* and *lower.* Through the definite comparisons, beginning with page 12, the child learns to answer the questions *how much? how many?* and by means of these answers develops the idea of number and numerical operations. Interest, judgment, acts of construction, all join in giving the child knowledge of number and power to use it.

CONSTRUCTION. Throughout the book are introduced various forms of constructive work such as the drawing of lines and rectangles in the earlier part of the book, and the construction problems on pages 101, 103, 105, 122, 128, 188, 196, etc. These not only add variety, but lead to increased power and facility, and will suggest to the teacher other forms of constructive work for the pupil. If pupils are not supplied with rulers, the teacher may show them how to

make their own. Take a strip of heavy paper or cardboard and cut it the length of the green line on page 18; then measure from one end of this ruler and mark on it the length of each line. This will give a six-inch ruler marked in inches. By means of the first figure on page 178, $\frac{1}{2}$ and $\frac{1}{4}$ inches may also be marked.

COUNTING. The child's natural tendency to separate wholes into parts and to unite the parts into wholes again, is indicated by his effort in counting by ones. This natural tendency should be encouraged, as it is a means of gaining facility in number. The counting table on page 42 should be worked out according to the suggestions at the foot of the page. At various points through the book pupils should be trained to form similar counting tables by 2's, 3's, 4's, 5's, etc. This not only interests the child, but is a great aid in securing skill in number combinations.

FUNDAMENTAL COMBINATIONS. Great effort should be made to render purely automatic the fundamental combinations. The first series of these will be found at the foot of page 43. Drills on the others are frequent and thorough, beginning with the material on page 108. The remainder of the 45 fundamental combinations are:

4	5	6	5	6	7	6	7	7	8	8	9
9	8	7	9	8	7	9	8	9	8	9	9
—	—	—	—	—	—	—	—	—	—	—	—

DENOMINATE NUMBERS. From page 68 to 87 the number knowledge acquired is applied to the simplest form of denominate numbers. This work leads the child to apply the numbers already learned to his everyday experience, by becoming familiar with a few simple facts of liquid and dry measures, weights, money and time. Children should be urged to construct simple problems which will apply these facts of denominate numbers.

FUNDAMENTAL OPERATIONS. Great care should be taken not to exceed the work planned in the fundamental operations, pages 88 to 100. At this stage the child will get his first knowledge of the formal use of these operations, and only the simplest forms of these processes

should be taught. In the second part, pages 164 to 177, another step is taken in the study of these operations and the same caution still applies. The final treatment is found on pages 230 to 235, and there the child should be required to master these truly fundamental processes of the science of arithmetic.

REVIEWS. The plan of the book requires constant reviews of the work that has previously been done. While the character of the drills and problems is such that necessarily this preceding work must have been thoroughly done, still the teacher should not fail to turn frequently to certain pages in the book and review them with special care. At various points suggestive reviews are indicated, as on pages 70, 130, 131, 146, 155, etc.

ORAL WORK. Too much attention can hardly be given to the oral work throughout the entire book. Many of the drill tables provide abstract number work of this sort and the teacher should see that such work is done orally. On certain pages, as on 130, 131, 160, 161, etc., a division of the page points out those which are distinctly oral problems. On many other pages there are problems which may be solved orally and the teacher should see that this is done, determining by the advancement of the pupils, which should be oral and which written.

FORMS OF STATEMENT. In both oral and written work care should be taken that the statements of problems are clear and concise. The following examples will serve as illustrations:

EXAMPLES:

(*a*) A man spends $2.40 for coffee, 80 cents for tea, $2.50 for flour, $1.75 for butter, and $1 for bacon. What is the amount of his purchase?

Statement: The amount of his purchase is the sum of $2.40, 80c, $2.50, $1.75, and $1, which is $8.45.

(*b*) What change should he receive from $10?

Statement: He should receive the difference between $10 and $8.45, which is $1.55.

(*c*) At $85 a head, what will 96 horses cost?

Statement: 96 horses will cost 96 times $85, or $8,160.

(*d*) In an orchard of 156 trees there are 12 rows. How many trees in a row?

Statement: There are as many trees as there are 12's in 156, or 13.

(d^2) Divide 96 marbles equally among 8 boys.

Statement: Each boy will receive ⅛ of 96 marbles, or 12 marbles.

Brief written statements should also be made from time to time, from the beginning of the 4th year, of problems in multiplication and division; e. g.:

1.

$85=cost of one horse.
96=number to be bought.

510
765

$8160=cost of 96 horses.

2.

156=number of trees.
12= " rows.
156÷12=13, " in each row.

3.

96=whole number of marbles.
8=number of boys to receive equal number.
⅛ of 96=12, number of marbles each boy receives.

SARAH C. BROOKS.

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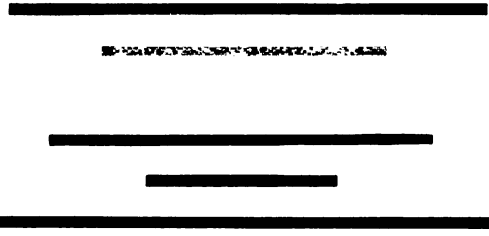
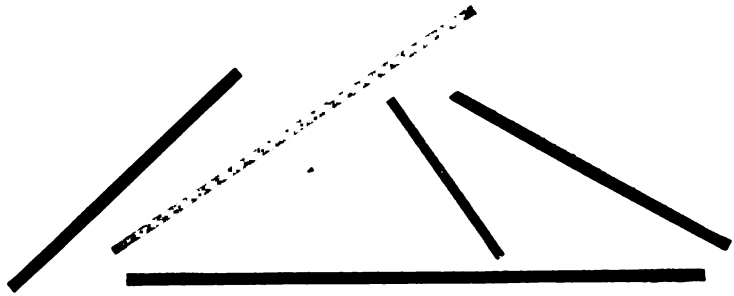
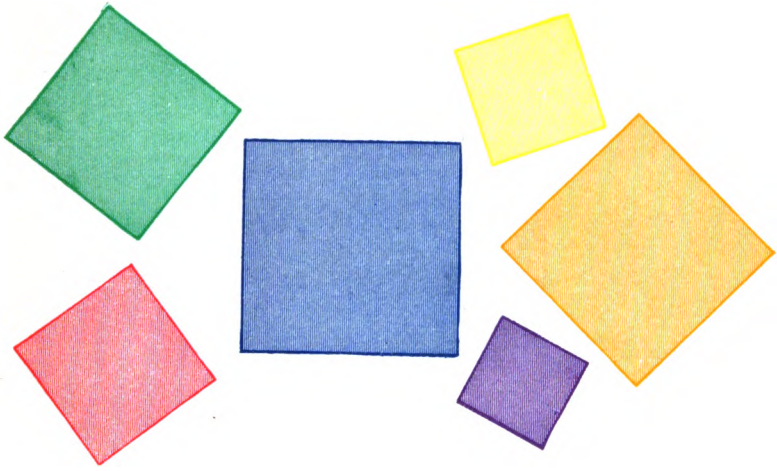
PART FIRST.



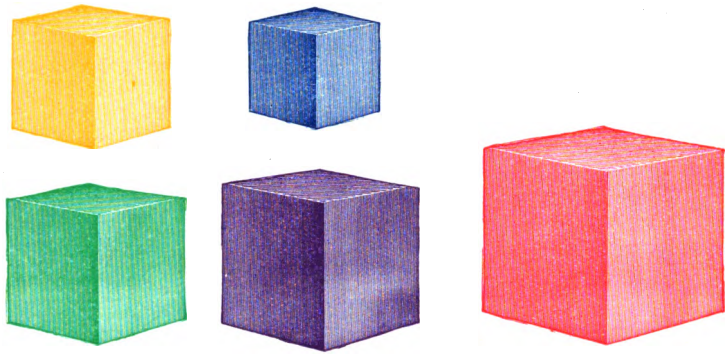
1. The red line is longer than which line?
2. The orange line is shorter than which line?
3. The yellow line is shorter than which line?
4. The green line is longer than which line?
5. The purple line is shorter than which line?
6. The blue line is longer than which line?
7. Which line is longer than the red line?
8. Which lines are shorter than the red line?
9. Which lines are longer than the orange line?
10. Which lines are shorter than the orange line?
11. Which lines are longer than the yellow line?
12. Which lines are longer than the green line?
13. Which lines are shorter than the green line?
14. Which lines are longer than the purple line?
15. Which lines are shorter than the purple line?
16. Which lines are shorter than the blue line?
17. Is any one of these lines longer than the blue line?
18. Is any one shorter than the yellow line?



1. Which line is longest?
2. Which line is next longest?
3. Which line is shortest?
4. What line is next shortest?
5. The red line is longer than which line?
6. The red line is shorter than which lines?
7. The green line is longer than which lines?
8. The green line is shorter than which lines?
9. The blue line is longer than which lines?
10. The blue line is shorter than which lines?
11. The orange line is longer than which lines?
12. The orange line is shorter than which line?
13. Two lines are equal, which are they?
14. How many of these lines are longer than the yellow line?
15. How many of these lines are longer than the red line?
16. How many of these lines are longer than the green line?
17. How many of these lines are shorter than the orange line?
18. How many of these lines are shorter than the purple line?



1. Which two squares are the largest?
2. Which two squares are the smallest?
3. The blue square is larger than which squares?
4. The orange square is smaller than which square?
5. The orange square is larger than which squares?
6. The green square is larger than which squares?
7. The green square is smaller than which squares?
8. The purple square is smaller than which squares?
9. The yellow square is larger than which square?
10. The yellow square is smaller than which squares?
11. The red square is larger than which squares?
12. How many squares are larger than the red square? How many are smaller?
13. How many squares are smaller than the green square? How many are larger?
14. How many squares are larger than the purple square? How many are smaller?
15. How many squares are larger than the yellow square?



1. Which is the largest cube?
2. Which is the next largest cube?
3. Which is the smallest cube?
4. Which is the next smallest cube?
5. The red cube is larger than which cubes?
6. The green cube is larger than which cubes?
7. The green cube is smaller than which cubes?
8. The blue cube is larger than which cube?
9. The blue cube is smaller than which cubes?
10. The purple cube is larger than which cubes?
11. The purple cube is smaller than which cube?
12. The orange cube is smaller than which cubes?
13. The orange cube is larger than which cubes?
14. The yellow cube is smaller than which cubes?
15. How many cubes are smaller than the orange cube?
16. How many cubes are larger than the orange cube?
17. How many cubes are smaller than the purple cube?
18. How many cubes are larger than the purple cube?
19. How many cubes are smaller than the green cube?
20. How many cubes are larger than the blue cube?

These questions should all be answered by the pupil without the use of a ruler; and if the pupil is uncertain, the teacher himself should answer without measuring.

1. Which is longer, the window or the door?
2. Which is wider, the door or the window?
3. Which is higher, your desk or the teacher's desk?
4. Which is longer, your desk or the teacher's desk?
5. Is the top of the blackboard higher than the top of the door?
6. Is your desk farther from the door or from the teacher's desk?
7. Which is longer, your pencil or your penholder?
8. Is a piece of crayon the same size at both ends?
9. Which is larger, your slate or the cover of your Arithmetic?
10. Which is thicker, your Arithmetic or your slate?
11. Are the four sides of your slate the same length? Are any two sides of it the same length?
12. Which is larger, your house or the school-house? Which is higher?
13. Which is wider, the sidewalk in front of the school-house or that in front of your house?
14. Which is wider, the street in front of the school-house or that in front of your house?
15. Which is farther from your house, the store or the school?
16. Which is longer, the side of the school-house, or the end of it?
17. Are all the edges of a brick the same length?
18. Is a brick longer than it is wide? Is is thicker than it is wide?

1. The red line is how many times as long as the blue line?
2. The red line and the blue line equal which line?
3. The purple line is how many times as long as the blue line?
4. The purple line and the blue line equal which line?
5. The red line and which line equal the purple line?
6. The purple line and which line equal the yellow line?
7. If from the purple line we take a line equal to the blue, which line will the remainder equal?
8. If from the purple line we take a line equal to the red, which line will the remainder equal?
9. If from the yellow line we take a line equal to the blue, which line will the remainder equal?
10. If from the yellow line we take a line equal to the red, which line will the remainder equal?
11. If from the yellow line we take a line equal to the purple, which line will the remainder equal?
12. The blue line equals what part of the red?
13. The purple line is how many times as long as the blue line?
14. The blue line equals what part of the purple?
15. The yellow line is how many times as long as the blue line?

NOTE.—The exercises on pages 12, 16, 20, 24 and 28 may be varied by the use of colored sticks or by colored lines upon the board, drawn the same length as patterns given or scaled longer. These should be placed in different positions so as to test judgment further.

1. The blue line equals what part of the yellow line?
2. The yellow line is how many times as long as the red line?
3. The red line equals what part of the yellow line?
4. The yellow line is equal in length to which two other lines?
5. The purple line equals what part of the yellow line?
6. Two times the blue line equals which line?
7. Three times the blue line equals which line?
8. Four times the blue line equals which line?
9. Two times the red line equals which line?
10. What is the length of the blue line? Of the red? Of the purple? Of the yellow?
11. 2 inches and 1 inch are _____ inches.
12. 3 inches and 1 inch are _____ inches.
13. 3 inches equal 2 inches and _____ inch.
14. 4 inches equal 2 inches and _____ inches.
15. 3 inches less 1 inch are _____ inches.
16. 4 inches less 2 inches are _____ inches.
17. 4 inches less 1 inch are _____ inches.
18. 3 inches less 2 inches are _____ inch.
19. 4 inches less 3 inches are _____ inch.
20. 1 inch is what part of 3 inches?
21. 2 inches are what part of 3 inches?
22. 1 inch is what part of 4 inches?
23. 2 inches are what part of 4 inches?
24. 3 inches are what part of 4 inches?
25. 3 inches are three times _____ inch.
26. 1 inch is one-third of _____ inches.
27. 3 inches are one and one-half times _____ inches.
28. 2 inches are two-thirds of _____ inches.

1. 4 inches are four times _____ inch.
2. 1 inch is one-fourth of _____ inches.
3. 4 inches are two times _____ inches.
4. 2 inches are one-half of _____ inches.
5. 4 inches are one and one-third times _____ inches.
6. 3 inches are three-fourths of _____ inches.
7. James spent 2 cents for an apple and for an orange 2 cents more than for the apple. The orange cost _____ cents.
8. Helen had three books. Her mother gave her one more; how many had she then?
9. Joe sold two papers and John sold one; how many did both sell?
10. A fence is four feet high and a gate in it is one foot lower; how high is the gate?
11. At one cent each, what will three apples cost?
12. At $\frac{1}{2}$ cent each, what will four apples cost?
13. When oranges cost 2 cents each, how many can be bought for 4 cents?
14. Harry lives four blocks from the school-house, and Bert lives one-half as far. How many blocks is it from Bert's house to the school-house?
15. A girl paid 4 cents for a spool of thread and 2 cents less for needles; how much did she pay for the needles?
16. A piece of crayon four inches long is broken into four equal parts; how long is each part?
17. George had three marbles and lost one; how many did he then have? What part did he lose?
18. A boy bought four sticks of candy and ate two of them; what part had he left?

1. Charlie earned 3 cents and spent 1 cent for a top; what part of his money did he spend?
2. Mary walks four blocks to school and Ethel one-fourth as far; how many blocks does Ethel walk?
3. John can jump four feet and Charlie one-half as far; how many feet can Charlie jump?
4. Alfred worked 3 days and Carl one-third as many days; how many days did Carl work?
5. A stick is three feet long, a piece one foot long is broken off; what part is broken off? What part is left?
6. Combinations for Drill:

Addition

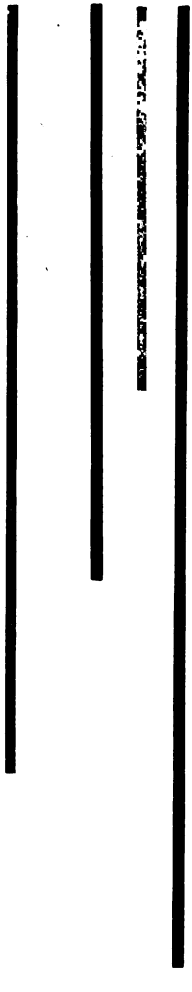
1	2	2	1	1	2
1	2	1	3	2	1
				1	1

1	1	3	2	2	1
?	?	?	?	?	?
2	4	4	4	3	3

Subtraction

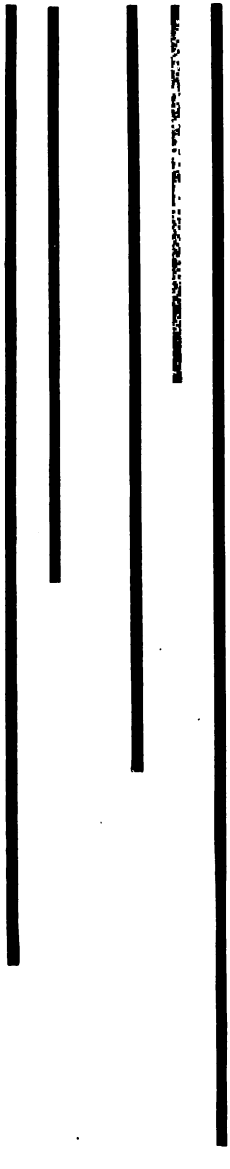
4	3	2	4	4	3
?	?	?	?	?	?
2	1	1	1	3	2

$\frac{1}{3}$ of 3=	$\frac{1}{4}$ of 4=	$\frac{3}{4}$ of 4=
$\frac{2}{3}$ of 3=	$\frac{2}{4}$ of 4=	$\frac{1}{2}$ of 4=



1. The red line is how many times as long as the yellow line?
2. The red line and the yellow line equal which line?
3. The purple line is how many times as long as the yellow line?
4. The orange line is how many times as long as the yellow line?
5. The orange line and the purple line equal which line?
6. The yellow line and which line equal the blue line?
7. The orange line and which line equal the blue line?
8. The purple line and which line equal the blue line?
9. The red line and which line equal the blue line?
10. If from the blue line we take a line equal to the yellow, which line will the remainder equal?
11. If from the blue line we take a line equal to the orange, which line will the remainder equal?
12. If from the blue line we take a line equal to the purple, which line will the remainder equal?
13. If from the blue line we take a line equal to the red, which line will the remainder equal?
14. The blue line is how many times as long as the yellow?

1. The yellow line equals what part of the blue?
2. The blue line is how many times as long as the orange?
3. The orange line equals what part of the blue?
4. The blue line is how many times as long as the purple?
5. The purple line equals what part of the blue?
6. The blue line is how many times as long as the red?
7. The red line equals what part of the blue?
8. What is the length of the yellow line? Of the orange? Of the purple? Of the red? Of the blue?
9. A boy paid 2 cents for paper, 1 cent for a penholder and 2 cents for pens; how much did he pay for all?
10. Helen had 5 pennies. She gave one to her brother, and lost one; how many had she left?
11. If you have a nickel and buy a top for 3 cents, how much change should you receive?
12. How many 2-cent stamps can you get for a nickel? How much money will you have left?
13. Paul had five peaches. He ate one, how many had he left? He gave half the remainder to his sister; how many did he give her?
14. Charles is five years old and the baby is one-fifth as old; how old is the baby?
15. Peter had 5 dollars and bought a hat for 2 dollars; what part of his money did the hat cost?
16. James had five apples. He gave one-fifth of them to his brother; how many apples had he left? What part had he left?



1. The blue line is how many times as long as the yellow?
2. The blue line and the yellow line equal which line?
3. The purple line is how many times as long as the yellow?
4. The orange line is how many times as long as the yellow?
5. The orange line and the purple line equal which line?
6. The red line is how many times as long as the yellow?
7. The red line and the orange line and the yellow line equal which line?
8. The yellow line and which line equal the green?
9. The orange line and which line equal the green?
10. The red line and which lines equal the green?
11. The purple line and which line equal the green?
12. The blue line and which line equal the green?
13. If from the green line we take a line equal to the yellow, which line will the remainder equal?
14. If from the green line we take a line equal to the orange, which line will the remainder equal?

1. If from the green line we take a line equal to the red, which line will the remainder equal?
2. If from the green line we take a line equal to the purple, which line will the remainder equal?
3. If from the green line we take a line equal to the blue, which line will the remainder equal?
4. Three times the yellow line equals which line?
5. Six times the yellow line equals which line?
6. Two times the red line equals which line?
7. The green line is two times as long as which line?
8. The red line is one-half as long as which line?
9. Two times the yellow line equals which line?
10. Six times the yellow line equals which line?
11. Three times the orange line equals which line?
12. The green line is three times as long as which line?
13. The orange line is one-third as long as which line?
14. The green line is how many times as long as the yellow?
15. The yellow line equals what part of the green?
16. The green line is how many times as long as the orange?
17. The orange line equals what part of the green?
18. The green line is how many times as long as the red?
19. The red line equals what part of the green?
20. The green line is how many times as long as the purple?
21. The purple line equals what part of the green?
22. The green line is how many times as long as the blue?
23. The blue line equals what part of the green?
24. What is the length of the yellow line?

(*See figure on page 18.*)

1. What is the length of the orange line?
2. What is the length of the red line?
3. What is the length of the purple line?
4. What is the length of the blue line?
5. What is the length of the green line?
6. 5 inches and 1 inch are _____ inches.
7. 4 inches and 2 inches are _____ inches.
8. 3 inches and 3 inches are _____ inches.
9. 6 inches equal 1 inch and _____ inches.
10. 6 inches equal 3 inches and _____ inches.
11. 6 inches equal 5 inches and _____ inch.
12. 6 inches equal 2 inches and _____ inches.
13. 6 inches equal 4 inches and _____ inches.
14. 6 inches less 5 inches are _____ inch.
15. 6 inches less 3 inches are _____ inches.
16. 6 inches less 1 inch are _____ inches.
17. 6 inches less 4 inches are _____ inches.
18. 6 inches less 2 inches are _____ inches
19. 1 inch is what part of 6 inches?
20. 3 inches are what part of 6 inches?
21. 5 inches are what part of 6 inches?
22. 2 inches are what part of 6 inches?
23. 4 inches are what part of 6 inches?
24. 6 inches are two times _____ inches.
25. 3 inches are one-half of _____ inches.
26. 6 inches are three times _____ inches.
27. 2 inches are one-third of _____ inches.
28. 6 inches are one and one-half times _____ inches.
29. 4 inches are two-thirds of _____ inches.
30. 6 inches are one and one-fifth times _____ inches.

1. 5 inches are five-sixths of _____ inches.
2. Harry had a nickel and a penny; how many cents had he?
3. James had six books and gave away two. How many books had he left?
4. A boy earned three cents one day, and three cents the next day; how much did he earn in both days?
5. Helen is four years old, and her sister is two years older; how old is her sister?
6. A quart of milk costs six cents; how much does half a quart cost? *
7. A boy walked two miles in one hour; how many miles can he walk in three hours?
8. There are six stores in one block and two-thirds as many in the next. How many stores are there in the second block?
9. Robert had six tops and lost four. What part did he lose? What part had he left?
10. Jessie had two dolls, which were one-third as many as May had; how many had May?
11. Mary had six cents and spent half of her money; how much did she spend?
12. Henry spent four cents for an orange, and half as much for an apple; how much did both cost? The orange cost how much more than the apple?
13. There are two piles of boxes; in the first pile there are six boxes; in the second pile there are two-thirds as many. How many boxes are there in the second pile?

* In all such problems in Part First, the expression "at the same rate," or its equivalent, is understood.

1. At 2 cents each, two tops will cost _____ cents.
2. Three apples and two apples are _____ apples.
3. A nickel equals 1 cent and two times _____ cents.
4. One-half of four marbles is _____ marbles.
5. Three pencils at 1 cent each, and one pencil at 2 cents together will cost _____ cents.
6. A rope is six feet long; one-half of it is _____ feet long.
7. At $2\frac{1}{2}$ cents each, two blocks of paper will cost _____ cents.
8. A quart of milk costs 6 cents, and one-third of a quart costs _____ cents.
9. When peaches cost 3 cents each, with 6 cents one can buy _____ peaches.
10. One quart equals two pints, and two quarts equal _____ pints.
11. Charlie gave one-half of an apple to each of six boys, to all he gave _____ apples.
12. A boy earned 6 cents and spent 4; he then had _____ cents left.
13. A man walks two blocks and rides three more. In all he goes _____ blocks.
14. At 3 cents each, two balls will cost _____ cents.
15. Harry had six marbles. He lost three and bought one more; he then had _____ marbles.
16. A door is six feet high and two-thirds as wide. Its width is _____ feet.
17. Bessie had six cents and spent one-third of her money. She then had _____ cents.
18. When oranges are 2 cents each, for 9 cents one can buy _____ oranges.

Combinations for Drill:

Addition

2	3	1	2	4	3	3
2	2	5	4	1	3	1

2	2	1	4	2	1
1	2	3	1	2	2
1	2	1	1	1	3

1	1	3	2	1	1
1	1	1	1	4	3
1	2	1	3	1	2
1	1	1			

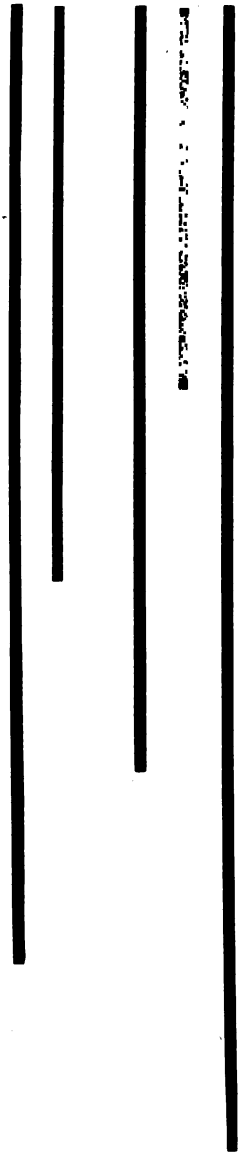
Subtraction

4	5	4	6	5	6
2	1	3	4	3	2

6	5	6	6	5
1	2	5	3	4

$\frac{1}{5}$ of 5=	$\frac{3}{6}$ of 6=	4 is two times ?
$\frac{2}{5}$ of 5=	$\frac{5}{6}$ of 6=	5 is two times ?
$\frac{3}{5}$ of 5=	$\frac{2}{6}$ of 6=	6 is two times ?
$\frac{4}{5}$ of 5=	$\frac{4}{6}$ of 6=	6 is three times ?
$\frac{1}{6}$ of 6=	$\frac{1}{3}$ of 6=	6 is one and one-half
$\frac{1}{2}$ of 6=	$\frac{2}{3}$ of 6=	times ?

2 is $\frac{1}{2}$ of ?	3 is $\frac{1}{2}$ of ?	4 is $\frac{4}{5}$ of ?
2 is $\frac{1}{3}$ of ?	3 is $\frac{3}{4}$ of ?	$2\frac{1}{2}$ is $\frac{1}{2}$ of ?
2 is $\frac{2}{3}$ of ?	4 is $\frac{2}{3}$ of ?	5 is $\frac{5}{6}$ of ?

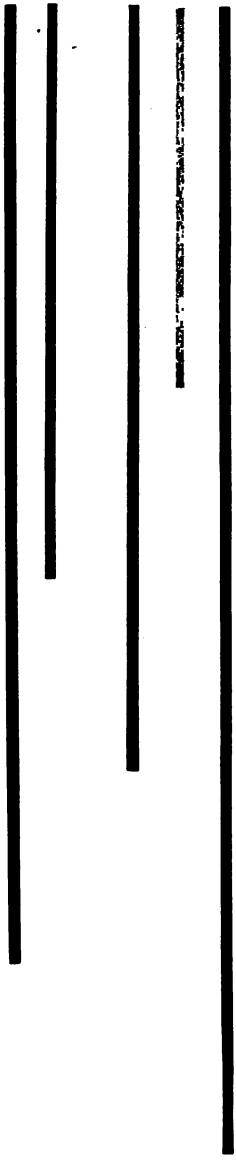


1. How long is each line?
2. How long are the green line and the yellow line together? The blue and the orange? The purple and the red?
3. How long are the green line and the orange line together? The blue and the red? The purple and the red and the yellow?
4. The orange line and which line are together 7 inches long?
5. The red line and which line are together 7 inches long?
6. The yellow line and which line are together 7 inches long?
7. The orange line and the purple line and which other line are together 7 inches long?
8. Two times the red line and which other line are together 7 inches long?
9. Two times the yellow line and which other line are together 7 inches long?
10. Three times the orange line and which line are together 7 inches long?
11. The orange line and which line are together 8 inches long?
12. The red line and which line are together 8 inches long?

1. The purple line and the red line and which other line are together 8 inches long?
2. The blue line and the yellow line and which other line are together 8 inches long?
3. Two times the orange line and which other line are together 8 inches long?
4. Two times the red line and which other line are together 8 inches long?
5. Two times the yellow line and which line are together 8 inches long?
6. If from a line equal to the green line and the yellow line we take a line equal to the orange, which line will the remainder equal?
7. If from a line equal to the green line and the yellow line we take a line equal to the red, which line will the remainder equal?
8. If from a line equal to the green line and the orange line we take a line equal to the red, which line will the remainder equal?
9. If from a line equal to the green line and the orange line we take a line equal to the purple, which line will the remainder equal?
10. Two times the purple line equals the length of the green line and which other line together?
11. A line equal to the green line and the orange line together is two times as long as which line?
12. Four times the orange line is equal to a line made up of the green line and which other line?
13. A line equal to the green line and the orange line together is four times as long as which other line?

1. 7 inches equal 2 inches and 3 inches and _____ inches.
2. 7 inches equal 4 inches and 2 inches and _____ inch.
3. 7 inches equal 1 inch and two times _____ inches.
4. 8 inches equal 2 inches and 4 inches and _____ inches.
5. 8 inches equal 3 inches and 2 inches and _____ inches.
6. 8 inches equal 2 inches and 2 inches and _____ inches.
7. 1 inch is what part of 7 inches? 2 inches are what part? 5 inches are what part?
8. 1 inch is what part of 8 inches? 3 inches are what part? 7 inches are what part?
9. 2 inches are what part of 8 inches?
10. 6 inches are what part of 8 inches?
11. 4 inches are what part of 8 inches?
12. 7 inches are three and one-half times _____ inches.
13. 2 inches are two-sevenths of _____ inches.
14. 7 inches are two times _____ inches.
15. $3\frac{1}{2}$ inches are one-half of _____ inches.
16. 7 inches are one and three-fourths times _____ inches.
17. 4 inches are four-sevenths of _____ inches.
18. 8 inches are four times _____ inches.
19. 2 inches are one-fourth of _____ inches.
20. 8 inches are two times _____ inches.
21. 4 inches are one-half of _____ inches.
22. 8 inches are one and one-third times _____ inches.
23. 6 inches are three-fourths of _____ inches.

1. Charles had 4 picture cards, and his mother gave him 3 more; how many had he then?
2. Mary had 7 pigeons, she sold 2. How many did she have left?
3. Clara spent 2 weeks in the country at Christmas, and 6 weeks during the summer. How many weeks did she spend there on both visits?
4. Fred is 8 years old, and his brother is half as old. How old is his brother?
5. A boy picked 8 quarts of berries, and sold 6 of them. How many quarts had he left?
6. Robert had 7 cents. He bought as many balls at 3 cents each as he could. How many did he get, and how many cents did he have left? What part of his money was left?
7. If one orange costs 4 cents, how much will 2 oranges cost?
8. James earned 8 cents, and spent $\frac{1}{4}$ of it. How much money did he have left?
9. A girl was sick two days in one week. What part of the seven days was she sick?
10. Alice had 8 flowers. She gave 6 to her teacher. What part did she give her?
11. A boy had 8 cents, and paid 2 cents for a ball. What part of his money did he spend for the ball?
12. Frank spent 7 cents for candy, and May spent $\frac{1}{7}$ as much. How much did May spend? How much did both spend?
13. Julia's book is 8 inches long and $\frac{1}{2}$ as wide. How wide is it? It is $\frac{1}{4}$ as thick as it is wide. How thick is it?



1. Find the length of every line.
2. How long are the green, the orange, and the yellow line together?
3. How long are the blue and the purple line together?
4. How long are the green and the red line together?
5. The green line is equal to how many lines the length of the red?
6. How many lines the length of the red can be made from one 9 inches long?
7. How long are the green, the red, and the yellow line together?
8. How long are the blue, the orange, and the red line together?
9. How long are the blue, the purple, and the yellow line together?
10. How long are the green and the purple line together?
11. How long are the green and the blue line together?
12. How long are the yellow, the green, and the purple line together?
13. How long are the orange, the green, and the red line together?
14. How long are the purple, the blue, and the orange line together?
15. The green line and which line are together 9 inches long?

1. The blue line and which line are together 9 inches long?
2. The purple line and the orange line and which other line are together 9 inches long?
3. The red line and which line are together 9 inches long?
4. Two times the purple line and which line are together 9 inches long?
5. Two times the red line and which two lines are together 9 inches long?
6. Which two lines are together 9 inches long?
7. The blue, the red, and which line are together 10 inches long?
8. The green, the red, and which line are together 10 inches long?
9. The purple line and which line are together 10 inches long?
10. Two times the purple line and which line are together 10 inches long?
11. Three times the orange line and which line are together 10 inches long?
12. Two times which line equals 10 inches?
13. The green, the purple, and which line are together 11 inches long?
14. The blue, the orange, and which line are together 11 inches long?
15. The green, the orange, and which line are together 11 inches long?
16. Which two lines are together 11 inches long?
17. Two times the purple line and which line are together 11 inches long?

1. Two times the blue line and which line are together 11 inches long?
2. If from a line as long as the green and the red together, we take a line equal to the blue, which line will the remainder equal?
3. If from a line as long as the green and the red together, we take a line equal to the purple, which line will the remainder equal?
4. If from a line as long as the green and the purple together, we take a line equal to the blue, which line will the remainder equal?
5. If from a line as long as the green and the blue together, we take a line equal to the orange, which lines will the remainder equal?
6. If from a line as long as the green and the blue together, we take a line equal to the yellow, which lines will the remainder equal?
7. How long are the red line and the orange line together?
8. How long are the blue, the red, and the orange line together?
9. How many lines the length of the blue can be made from the blue, the red, and the orange line together?
10. The blue line is what part of a line 10 inches long?
11. How many inches long is a line which is one-half of a line 10 inches long?
12. The blue and the red line together are how many times as long as the orange?
13. The orange line is what part of a line 10 inches long?
14. The purple line is what part of a line 10 inches long?
15. The green line is what part of a line 10 inches long?

1. 9 inches are 3 inches and 4 inches and _____ inches.
2. 9 inches are 2 inches and 3 inches and _____ inches.
3. 9 inches are 3 inches and 3 inches and _____ inches.
4. 10 inches are 5 inches and 3 inches and _____ inches.
5. 10 inches are 4 inches and 5 inches and _____ inch.
6. 10 inches are 3 inches and 2 inches and _____ inches.
7. 10 inches are 5 inches and 2 inches and _____ inches.
8. 11 inches are 8 inches and _____ inches.
9. 11 inches are 4 inches and _____ inches.
10. 11 inches are 6 inches and _____ inches.
11. 11 inches are 5 inches and 3 inches and _____ inches.
12. 11 inches are 7 inches and 2 inches and _____ inches.
13. What part of 9 inches is 1 inch? Two inches? Four inches? Five inches? Seven inches? Eight inches?
14. What part of 9 inches are 3 inches? 6 inches?
15. What part of 9 inches are $4\frac{1}{2}$ inches?
16. 9 inches are how many times 1 inch? 2 inches? 4 inches? 5 inches? 7 inches? 8 inches?
17. 9 inches are how many times 3 inches? 6 inches? $4\frac{1}{2}$ inches?
18. What part of 10 inches is 1 inch? 3 inches? 7 inches? 9 inches?

1. What part of 10 inches are 2 inches? 4 inches? 6 inches? 8 inches?
2. What part of 10 inches are 5 inches?
3. 10 inches are how many times 1 inch? 3 inches? 7 inches? 9 inches?
4. 10 inches are how many times 2 inches? 4 inches? 6 inches? 8 inches?
5. 10 inches are how many times 5 inches?
6. What part of 11 inches is 1 inch? 2 inches? 3 inches?
7. 11 inches are how many times 1 inch? 2 inches? 3 inches?
8. 9 inches are three times _____ inches.
9. 3 inches are one-third of _____ inches.
10. 9 inches are one and one-half times _____ inches.
11. 6 inches are two-thirds of _____ inches.
12. 9 inches are two times _____ inches.
13. $4\frac{1}{2}$ inches are one-half of _____ inches.
14. 10 inches are five times _____ inches.
15. 2 inches are one-fifth of _____ inches.
16. 10 inches are two and one-half times _____ inches.
17. 4 inches are two-fifths of _____ inches.
18. 10 inches are one and two-thirds times _____ inches.
19. 6 inches are three-fifths of _____ inches.
20. 10 inches are one and one-fourth times _____ inches.
21. 8 inches are four-fifths of _____ inches.
22. 10 inches are two times _____ inches.
23. 5 inches are one-half of _____ inches.
24. $5\frac{1}{2}$ inches are one-half of _____ inches.

1. James rode six miles on his bicycle one day, and three miles the next day. How many miles did he ride in both days?
2. A child goes to school five days each week. How many days does he go to school in two weeks?
3. A boy earned 10 cents. He lost 1 cent, and spent one-third of the remainder. How much did he have left?
4. How may eleven apples be divided equally between two boys?
5. How many pieces of wood two feet long can be sawed from a board ten feet long?
6. A table is three feet wide, and three times as long. How long is it?
7. A boy had ten papers and sold all but one-fifth of them. How many had he left?
8. At 2 cents each, how much will five pencils cost?
9. A rug is eight feet wide, and two feet longer than wide. How long is it?
10. There are nine seats in one row, and two-thirds as many in the next. How many seats are there in the second row?
11. A pile of stone is nine feet long and two-thirds as wide. How wide is it? It is one-half as high as it is wide. How high is it?
12. A street car goes six miles an hour. How many miles will it go in one and one-half hours? In one and one-third hours?
13. One jug holds four quarts. How many such jugs can be filled from nine quarts? How many quarts will be left?

1. If one bin holds three bushels, how many bushels will two such bins hold? How many such bins will be required to hold nine bushels? How many will be required to hold eleven bushels?
2. A cistern ten feet deep is half full of water. How many feet of water are there in it?
3. Four quarts equal one gallon. How many gallons do ten quarts equal? Eleven quarts?
4. A rope is nine feet long; one-third of it is cut off. What part remains, and what is its length?
5. A set of six books costs 9 dollars. What will one of these books cost? Three?
6. A box is eleven inches long, six inches wide and three inches high. How much longer is it than it is wide? How much longer is it than it is high? How much wider is it than it is high?
7. There are eleven cars in one train; nine-elevenths as many in the second; and seven-elevenths as many in the third. How many cars are there in the second train? The third train?
8. A wire ten feet long is cut into three equal parts. How long is each part? How long would each part be if the wire were cut into four equal parts? Into five equal parts? Into six equal parts?
9. One panel of a door is three-fourths of a foot wide; how wide are two such panels? The door is twice as wide as two panels; how wide is the door?
10. How many pieces of paper one inch wide and three inches long can be cut from a strip one inch wide and nine inches long? From a piece two inches wide and nine inches long?

Combinations for Drill:

Addition

5	3	3	6	4	5	7	6
2	4	5	2	4	4	2	3
7	6	8	5	6	4	8	2
3	4	2	5	5	7	3	9
3	4	1	2	3	2	4	3
2	3	5	3	3	3	5	4
2	1	2	4	3	5	2	4

Subtraction

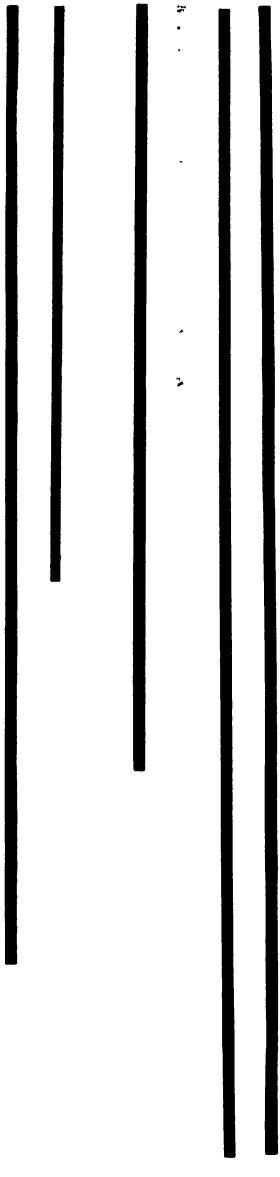
7	8	9	10	11	7	8	9
4	4	3	6	5	5	2	5
10	11	8	10	11	9	11	11
5	7	5	8	3	2	6	9

$\frac{1}{7}$ of 7=	$\frac{1}{2}$ of 8=	$\frac{1}{3}$ of 9=	$\frac{1}{5}$ of 10=
$\frac{5}{7}$ of 7=	$\frac{1}{4}$ of 8=	$\frac{2}{3}$ of 9=	$\frac{3}{5}$ of 10=
$\frac{1}{8}$ of 8=	$\frac{3}{4}$ of 8=	$\frac{1}{2}$ of 9=	$\frac{1}{2}$ of 10=
$\frac{3}{8}$ of 8=	$\frac{1}{9}$ of 9=	$\frac{1}{10}$ of 10=	$\frac{1}{11}$ of 11=
$\frac{5}{8}$ of 8=	$\frac{4}{9}$ of 9=	$\frac{3}{10}$ of 10=	$\frac{3}{11}$ of 11=

7 is two times ?
8 is two times ?
8 is four times ?

9 is three times ?
10 is two times ?
10 is five times ?

2 is $\frac{1}{4}$ of ?	3 is $\frac{1}{3}$ of ?	5 is $\frac{1}{2}$ of ?	6 is $\frac{3}{4}$ of ?
2 is $\frac{1}{5}$ of ?	4 is $\frac{1}{2}$ of ?	5 is $\frac{2}{3}$ of ?	8 is $\frac{4}{5}$ of ?



1. How many inches long are the green and the black line together?
2. What do we call so many inches?
3. How many times the green line equal a foot? The green line equals what part of a foot?
4. How many times the black line equal a foot? The black line equals what part of a foot?
5. The green, the blue, and which other line equal a foot?
6. The red, the purple, and which other line equal a foot?
7. The red, the yellow, the orange, and which other line equal a foot?
8. How many times the red line equal a foot? The red line equals what part of a foot?
9. How many times the red line equal three-fourths of a foot? How many inches equal three-fourths of a foot?
10. How many times the purple line equal a foot? The purple line equals what part of a foot?

1. How many times the purple line equal two-thirds of a foot? How many inches equal two-thirds of a foot?
2. How many times the orange line equal a foot? The orange line equals what part of a foot?
3. How many times the orange line equal one-half of a foot? How many times the orange line equal two-sixths of a foot? How many equal three-sixths? Four-sixths? Five-sixths?
4. Which two lines together equal one-half of a foot? Two-halves of a foot? One-quarter of a foot? Three-quarters of a foot? One-third of a foot? Two-thirds of a foot?
5. How many inches are there in one-sixth of a foot? In two-sixths? In three-sixths? In four-sixths?
6. How many 6 inches are there in 1 foot?
7. How many 3 inches are there in 1 foot?
8. How many 4 inches are there in 1 foot?
9. How many 2 inches are there in 1 foot?
10. Twelve are two _____.
11. Twelve are four _____.
12. Twelve are three _____.
13. Twelve are six _____.
14. Twelve are twelve _____.
15. One foot is _____ inches.
16. One-half of a foot is _____ inches.
17. One-fourth of a foot is _____ inches.
18. Two-halves of a foot are _____ inches.
19. Two-fourths of a foot are _____ inches.
20. Three-fourths of a foot are _____ inches.
21. Four-fourths of a foot are _____ inches.

1. 6 inches are one-half of _____ inches.
2. 3 inches are one-fourth of _____ inches.
3. 6 inches are two-fourths of _____ inches.
4. 9 inches are three-fourths of _____ inches.
5. One-third of a foot is _____ inches.
6. One-sixth of a foot is _____ inches.
7. Two-sixths of a foot are _____ inches.
8. Two-thirds of a foot are _____ inches.
9. Three-sixths of a foot are _____ inches.
10. Three-thirds of a foot are _____ inches.
11. Four-sixths of a foot are _____ inches.
12. Five-sixths of a foot are _____ inches.
13. Six-sixths of a foot are _____ inches.
14. 4 inches are one-third of _____ inches.
15. 8 inches are two-thirds of _____ inches.
16. 2 inches are one-sixth of _____ inches.
17. 4 inches are two-sixths of _____ inches.
18. Draw a line one-half of a foot long.
19. Draw a line one-fourth of a foot long.
20. Draw a line one-third of a foot long.
21. Draw a line one-sixth of a foot long.
22. Draw a line one-twelfth of a foot long.
23. Draw a line two-fourths of a foot long.
24. Draw a line two-thirds of a foot long.
25. Draw a line two-sixths of a foot long.
26. Draw a line two-twelfths of a foot long.
27. Draw a line three-fourths of a foot long.
28. Draw a line three-sixths of a foot long.
29. Draw a line three-twelfths of a foot long.
30. Draw a line four-sixths of a foot long.
31. Draw a line four-twelfths of a foot long.

1. What are twelve inches called?
2. What is the same number of eggs called?
3. What is the same number of months called?
4. How many winter months are there? What part of a year are the winter months?
5. How many summer months are there? What part of the year are the summer months?
6. What part of the year are the winter and summer months together?
7. How many spring months are there? How many fall months are there?
8. Each season is what part of a year? Each month is what part of a year?
9. If eggs are 12 cents a dozen, what will three-fourths of a dozen cost? Two-thirds of a dozen? One-half of a dozen?
10. If ten peaches cost 12 cents, how much will five peaches cost?
11. Eight lemons cost 8 cents; how much will a dozen cost?
12. Tom has twelve marbles, and George has two-thirds as many? How many marbles has George?
13. Harry spent 9 cents, which was three-fourths of what he earned; how much did he earn?
14. A rectangular flower bed is four feet long and two feet wide. What is the distance around the bed?
15. How many inches are there in the perimeter* of a square whose side measures three inches?
16. How many feet are there in the perimeter of a rug that is three feet long and two feet wide?

*The "perimeter" is the distance around.

1. George had 12 cents and paid one-fourth of it for a ruler. How much did he pay for the ruler? What part of 12 cents would he have paid for three rulers?
2. If a man can do a piece of work in twelve days, what part of it can he do in four days? In eight days?
3. If strawberries sell for 12 cents a box, and currants for five-sixths as much, how much will a box of currants sell for?
4. John walked twelve miles in a day, and George walked three-fourths as far. How far did George walk?
5. A man earns 2 dollars a day. How long will it take him to earn 12 dollars?
6. How many 2-cent postage stamps can be bought for a dime and 2 cents?
7. Harry found six eggs in one nest and two in another. What part of a dozen did he find?
8. If eight apples are worth 6 cents, how much is a dozen worth?
9. If one reads a book every month, how many books will he read in three-fourths of a year? How many in two-thirds of a year?
10. A shepherd had eight lambs in a pen. This was two-thirds as many as he had in another pen. How many did he have in the second pen?
11. There are twelve chickens in a coop; five-sixths as many in the yard; two-thirds as many in the barn, and three-fourths as many in a vacant lot. How many are there in each place?

Combinations for Drill:

Addition

8	11	9	6	10	7
4	1	3	6	2	5
6	3	6	2	4	2
2	2	3	4	4	8
4	7	3	6	4	2
4	5	6	2	3	1
?	?	?	?	?	?
12	12	12	12	12	12

Subtraction

12	12	12	12	12	12
8	3	6	4	9	5
12	12	12	12	12	12
?	?	?	?	?	?
2	11	7	1	10	8

$\frac{1}{2}$ of 6=	$\frac{1}{3}$ of 9=	$\frac{1}{4}$ of 8=
$\frac{1}{2}$ of 8=	$\frac{1}{3}$ of 12=	$\frac{1}{4}$ of 12=
$\frac{1}{2}$ of 10=	$\frac{2}{3}$ of 6=	$\frac{1}{6}$ of 12=
$\frac{1}{2}$ of 12=	$\frac{2}{3}$ of 9=	$\frac{3}{4}$ of 8=
$\frac{1}{3}$ of 6=	$\frac{2}{3}$ of 12=	$\frac{3}{4}$ of 12=

12 is two times ? 12 is six times ?
12 is three times ? 12 is one and one-half times ?
12 is four times ? 12 is one and one-third times ?

2 is $\frac{1}{6}$ of ?	4 is $\frac{1}{3}$ of ?	8 is $\frac{2}{3}$ of ?
3 is $\frac{1}{4}$ of ?	6 is $\frac{1}{2}$ of ?	9 is $\frac{3}{4}$ of ?

Ones	1 Ten Ten	2 Tens Twenty	3 Tens Thirty	4 Tens Forty	5 Tens Fifty	6 Tens Sixty	7 Tens Seventy	8 Tens Eighty	9 Tens Ninety	10 Tens One Hundred
Zero	Ten	Twenty								
0	10	20	30	40	50	60	70	80	90	100
One	Eleven	Twenty-One								
1	11	21	31	41	51	61	71	81	91	
Two	Twelve	Twenty-Two								
2	12	22	32	42	52	62	72	82	92	
Three	Thirteen	Twenty-Three								
3	13	23	33	43	53	63	73	83	93	
Four	Fourteen	Twenty-Four								
4	14	24	34	44	54	64	74	84	94	
Five	Fifteen	Twenty-Five								
5	15	25	35	45	55	65	75	85	95	
Six	Sixteen	Twenty-Six								
6	16	26	36	46	56	66	76	86	96	
Seven	Seventeen	Twenty-Seven								
7	17	27	37	47	57	67	77	87	97	
Eight	Eighteen	Twenty-Eight								
8	18	28	38	48	58	68	78	88	98	
Nine	Nineteen	Twenty-Nine								
9	19	29	39	49	59	69	79	89	99	

Read across the page — 10, 20, 30, etc.; 1, 11, 21, 31, etc.
Read downward by columns — 1, 2, 3, etc.; 10, 11, 12, etc.
Draw similar diagrams, and fill in, commencing with 100, 200, etc.

9	4	2
6	1	7
8	5	3

3	8	5
2	2	4
7	6	9

8	6	4
3	3	2
5	7	9

5	3	8
7	4	6
2	4	9

8	18	28
38	1	48
58	68	78

7	17	27
37	2	47
57	67	77

5	15	25
35	2	45
55	65	75

6	16	26
36	3	46
56	66	76

4	14	24
34	4	44
54	64	74

3	13	23
33	4	43
53	63	73

3	13	23
33	5	43
53	63	73

2	12	22
32	6	42
52	62	72

Add the red figure to each black figure in the same large square.

Take the red figure from each equal or larger black figure in the same large square.

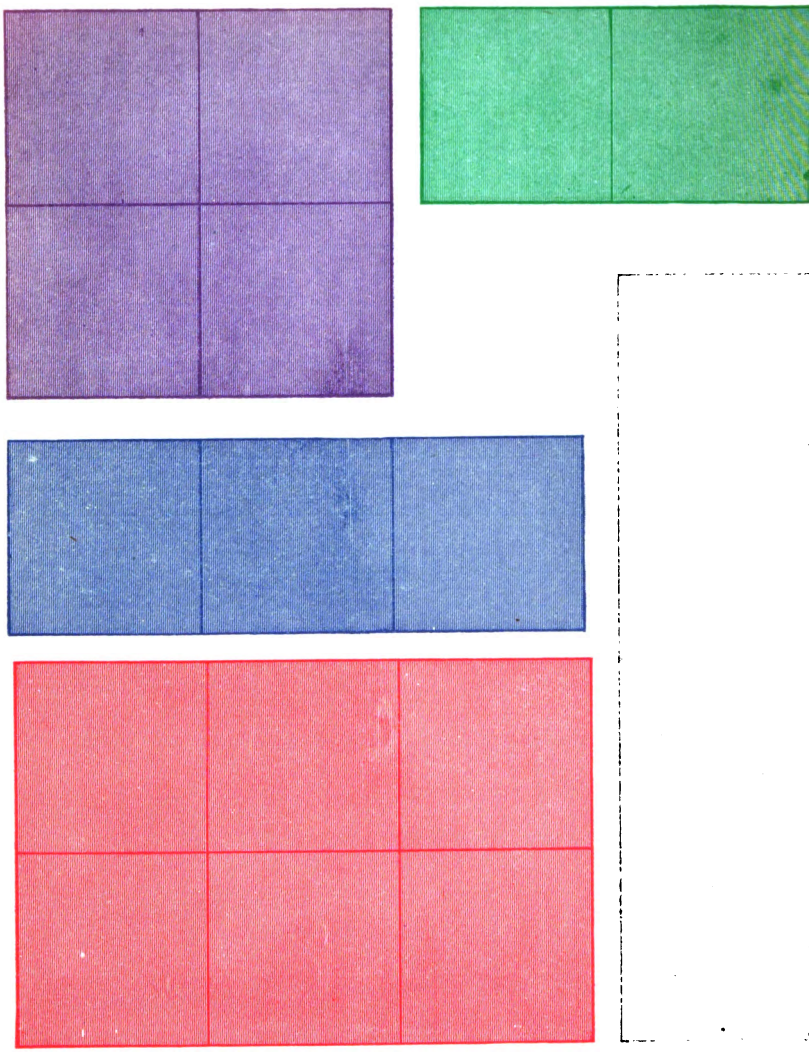
The above arrangement supplies material for still other drill work.

1	1	1	2	1	2	1	2	3	1	2
1	2	3	2	4	3	5	4	3	6	5

3	1	2	3	4	1	2	3	4	1	2
4	7	6	5	4	8	7	6	5	9	8

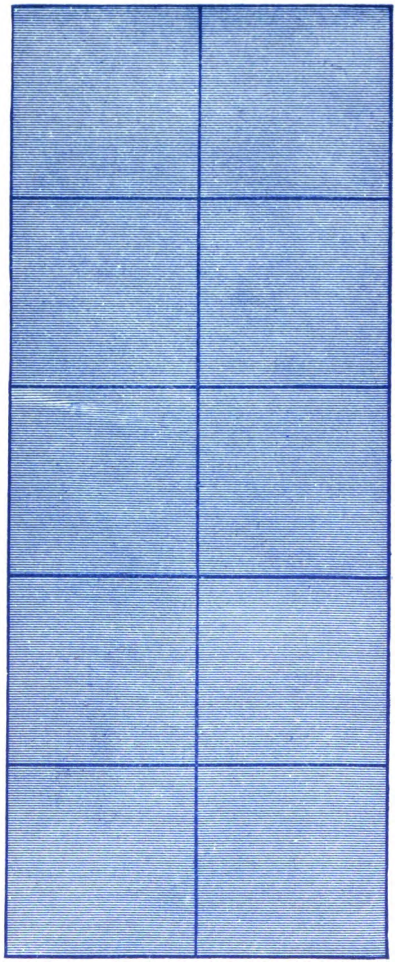
3	4	5	2	3	4	5	3	4	5	6
7	6	5	9	8	7	6	9	8	7	6

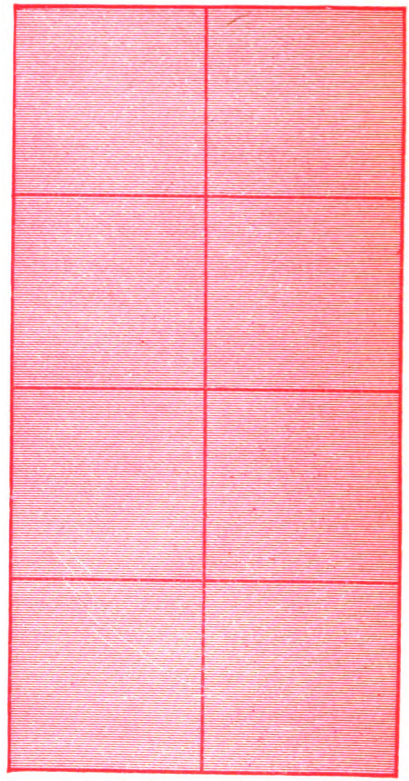
The above fundamental combinations should become automatic.



1. What is the size of the yellow square?
2. How long is the green rectangle? How wide is it?
3. How many square inches are there in the rectangle?

1. 1 square inch is what part of its surface, or area?
2. How long are the sides of the purple square?
3. How many rows of square inches are there in the purple square?
4. How many square inches are there in the upper row of the purple square? How many square inches are there in the whole square?
5. One row is what part of its area?
6. 1 square inch is what part of one row?
7. 1 square inch is what part of its whole area? 2 square inches are what part?
8. How long and how wide is the blue rectangle? Or, what are the dimensions of the blue rectangle?
9. How many square inches are there in the blue rectangle?
10. 1 square inch is what part of its area? 2 square inches are what part?
11. What are the dimensions of the orange rectangle?
12. How many square inches are there in the orange rectangle?
13. What are the dimensions of the red rectangle?
14. How many rows of 3 square inches are there in the red rectangle?
15. How many square inches are there in the red rectangle?
16. 1 square inch is what part of the area of the red rectangle? 2 square inches are what part?
17. How many rows of 2 square inches are there in the red rectangle?
18. One row is what part of the area?
19. One-third equals how many sixths?



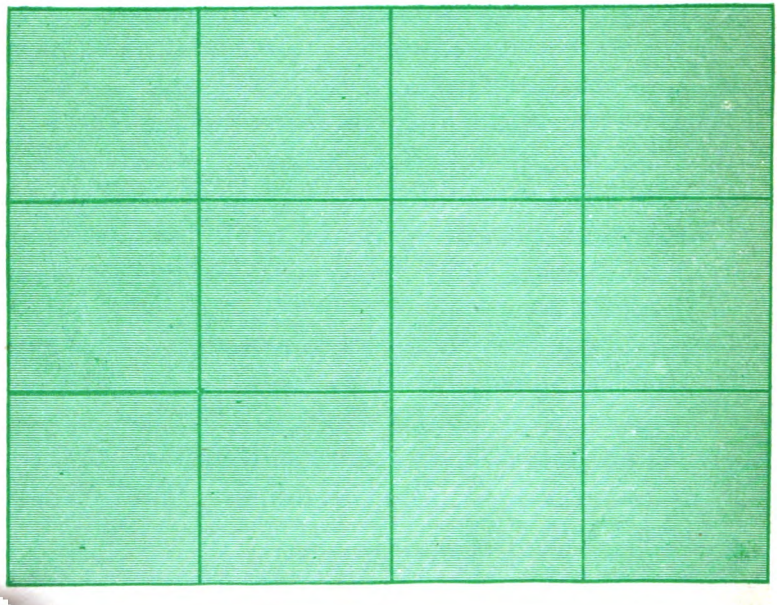


1. How long is the red rectangle? How wide is it?
2. How many rows of 4 square inches are there in the red rectangle?
3. One row is what part of its area?
4. How many rows of 2 square inches are there?

1. What part of its area is one row? Two rows? Three rows?
2. How many square inches are there in the rectangle?
3. How many 2 square inches are there in the surface? How many 3 square inches? How many 4 square inches?
4. What are the dimensions of the blue rectangle?
5. How many rows of 5 square inches are there in the rectangle? One row is what part of its area?
6. How many square inches are there in its surface?
7. How many rows of 2 square inches are there in the surface?
8. What part of its area is one row? Two rows? Three rows? Four rows?
9. What part of its area is 1 square inch? 2 square inches? 3 square inches? 4 square inches?
10. The area of the red rectangle equals what part of the area of the blue rectangle?
11. How many two-inch squares can be made from the red rectangle? From the blue rectangle?
12. How many rectangles 3 inches long and 1 inch wide can be made from the red rectangle? From the blue rectangle?
13. How many square inches are there in a two-inch square?
14. What are the dimensions of a rectangle having the same area as a two-inch square?
15. What is the length of the perimeter of a one-inch square? Of a two-inch square? Of the red rectangle?
16. Draw rectangles containing 6 square inches.

1. How long and how wide is the orange rectangle?
2. What is its area?
3. How many rows of 6 square inches are there in the rectangle?
4. One row is what part of the rectangle?
5. How many rows of 2 square inches are there?
6. What part of the area is one row? Two rows? Three rows? Four rows? Five rows?
7. How many two-inch squares can be made from the rectangle?
8. How many rectangles 3 inches long and 2 inches wide can be made? How many rectangles 3 inches long and 1 inch wide?
9. Draw other rectangles containing 12 square inches.

1. In the preceding figures, find the one that shows two ones; the figure that shows two twos; two threes; two fours; two fives; two sixes.
2. How many 2's in 2? How many 2's in 8?
   How many 2's in 4? How many 2's in 10?
   How many 2's in 6? How many 2's in 12?
3. One side of a square piece of glass is two inches long. How many square inches does it contain?
4. How many square rods are there in a field that is three rods long and two rods wide?
5. The top of a desk contains six square feet, and is three feet long. How wide is it?
6. There are eight square feet in a window that is four feet high. How wide is it?
7. How many square yards of carpet are there in a piece one yard wide and four yards long? In a piece two yards wide and four yards long?
8. A sidewalk is two feet wide. How long will a part of it be that contains twelve square feet?
9. How many square feet are there in one side of a board that is two feet long and one foot wide? How many square feet are there in both sides?
10. A table is two feet wide and three times as long. What is its length? How many square feet does it contain?
11. A piece of land is three rods long and one rod wide. How many rods of fence will be required to inclose it?
12. A field is four rods long and two rods wide. What is the length of all of its sides? What is its area?



1. What do we call the yellow figure? What is its area?
2. What part of its surface is one row? Two rows?
3. What part of its surface is 1 square inch? 2 square inches? 4 square inches? 3 square inches?
4. How many two-inch squares can be cut from the yellow square? How many can be made from it? Draw a square and illustrate.
5. What are the dimensions of the green rectangle?
6. How many two-inch squares can be cut from it? How many can be made from it? Draw a square and illustrate.
7. How many three-inch squares can be made from it?
8. How many rectangles containing 2 square inches can be made from it? How many containing 3 square inches? 4 square inches? 6 square inches?
9. Draw:

   A square containing 4 square inches. What are its dimensions?

   A rectangle containing 4 square inches. What are its dimensions?

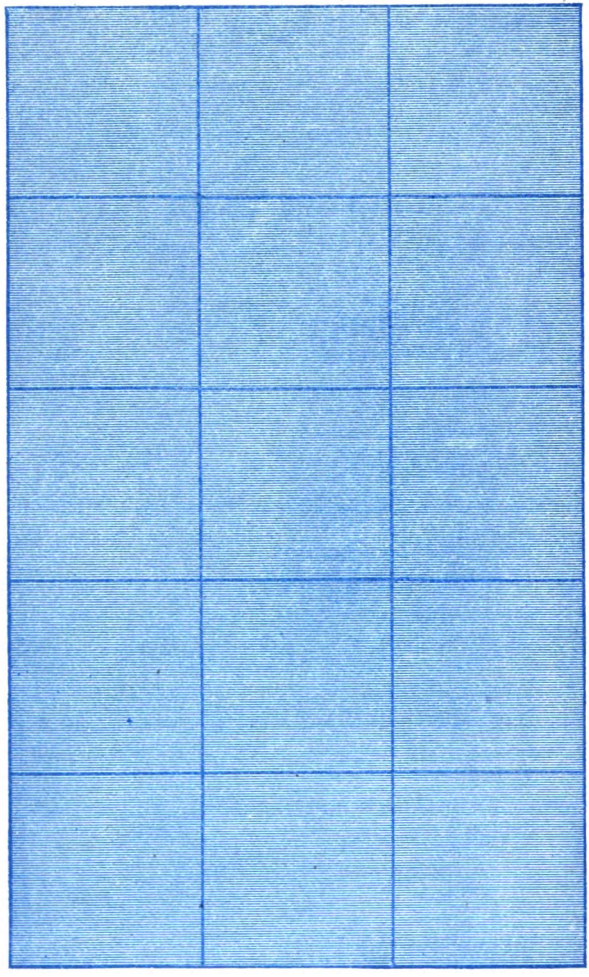
   A square containing 9 square inches. What are its dimensions?

   A rectangle containing 9 square inches. What are its dimensions?

   A rectangle containing 8 square inches. What are its dimensions?

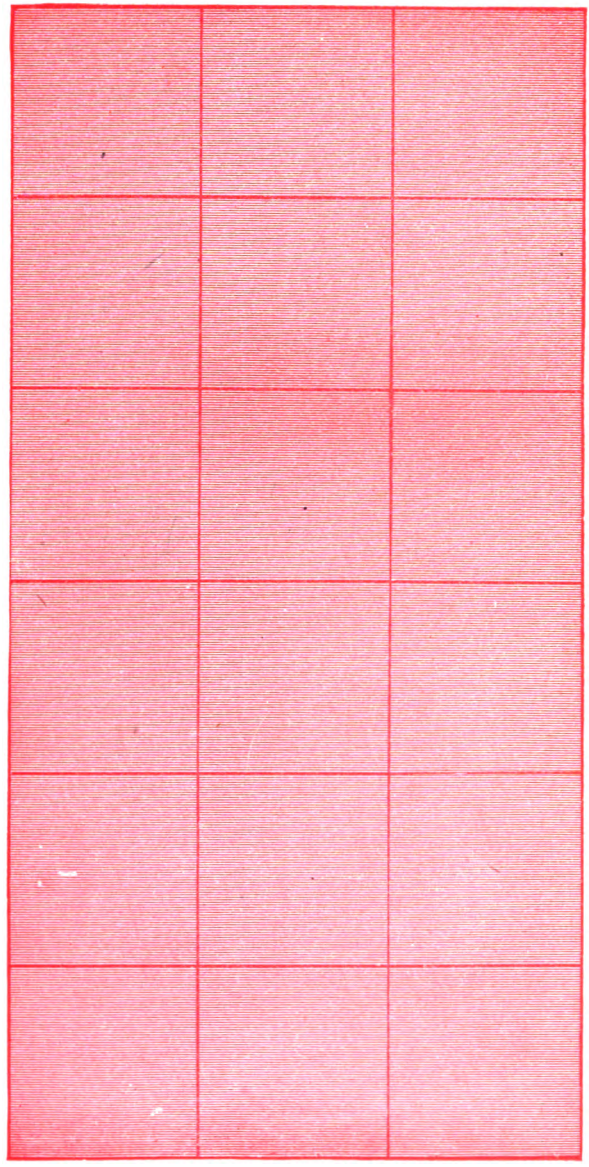
   A rectangle containing 10 square inches. What are its dimensions?

   A rectangle containing 12 square inches. What are its dimensions?



1. What are the dimensions of the blue rectangle?
2. What is its area?
3. What squares and rectangles can be cut or made from it?

1. What is the largest square that can be cut from the blue rectangle?
2. How many rows of 3 square inches are there in the blue rectangle?
3. How many rows of 5 square inches are there?
4. What part of the area is 3 square inches? 6 square inches? 9 square inches? 12 square inches?
5. What part of the area is 5 square inches? 10 square inches?
6. What is the length of the perimeter of the blue rectangle?
7. Draw another rectangle whose area is 15 square inches.
8. 6 and 6 are _____. 12 and 3 are _____.
   9 and 3 are _____. 6 and 9 are _____.
   8 and 4 are _____. 5 and 10 are _____.
   10 and 2 are _____. 8 and 7 are _____.
   7 and 5 are _____. 11 and 4 are _____.
9. 12 less 3 is _____. 15 less 5 is _____.
   12 less 6 is _____. 15 less 3 is _____.
   12 less 9 is _____. 15 less 10 is _____.
   12 less 4 is _____. 15 less 9 is _____.
   12 less 8 is _____. 15 less 12 is _____.
10. What part of 12 is 3? What part of 15 is 5?
    What part of 12 is 4? What part of 15 is 3?
    What part of 12 is 9? What part of 15 is 9?
    What part of 12 is 6? What part of 15 is 10?
    What part of 12 is 8? What part of 15 is 12?
11. 3 is $\frac{1}{2}$ of ? 3 is $\frac{1}{5}$ of ? 5 is $\frac{1}{2}$ of ?
    3 is $\frac{1}{3}$ of ? 4 is $\frac{1}{2}$ of ? 5 is $\frac{1}{3}$ of ?
    3 is $\frac{1}{4}$ of ? 4 is $\frac{1}{3}$ of ? 6 is $\frac{1}{2}$ of ?



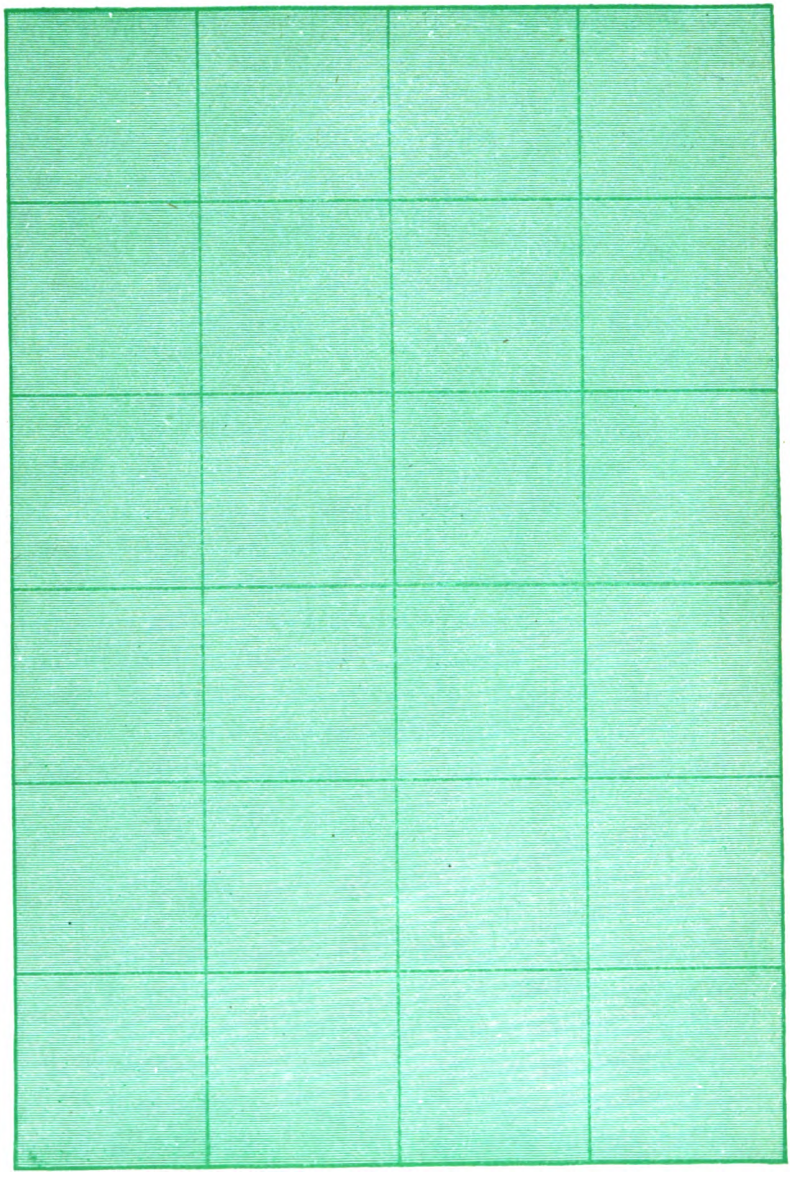
1. What are the dimensions of the red rectangle?
2. What is its area?
3. How many rows of 6 square inches are there in the rectangle?
4. What part of the area is one row? What part is two rows?
5. How many rows of 3 square inches are there in the rectangle?
6. What part of the area is one row? What part is two rows? Three rows? Four rows? Five rows?
7. What part of the area is 1 square inch? What part is 2 square inches? 3 square inches? 9 square inches? 10 square inches?
8. How many two-inch squares can be cut from the rectangle? How many can be made from it?
9. How many three-inch squares can be cut from the rectangle?
10. How many rectangles 2 inches long and 1 inch wide can be made from the red rectangle?
11. How long is the perimeter of the red rectangle?
12. 9 and 9 are _____. 18 − 9 =
    6 and 12 are _____. 18 − 6 =
    3 and 15 are _____. 18 − 3 =
    10 and 8 are _____. 18 − 12 =
13. In 18 there are how many 6's? What part of 18 is 6?
    In 18 there are how many 3's? What part of 18 is 3?
    In 18 there are how many 9's? What part of 18 is 9?
    In 18 there are how many 2's? What part of 18 is 2?
14. How many 3's in 3? How many 3's in 12?
    How many 3's in 6? How many 3's in 15?
    How many 3's in 9? How many 3's in 18?

1. What is the length of one side of the orange square?
2. How many rows of square inches are there in its surface?
3. One row is what part of the surface? Two rows are what part? Three rows are what part? Four rows are what part?
4. How many square inches are there in each row?
5. How many square inches are there in the entire area?
6. 1 square inch is what part of a row? 2 square inches are what part? 3 square inches are what part?

1. 1 square inch is what part of the entire area? 2 square inches are what part? 3 square inches are what part? 4 square inches? 8 square inches? 12 square inches?
2. How many two-inch squares can be made from the orange square? How many three-inch squares?
3. How many rectangles 2 inches long and 1 inch wide can be made from the orange square?
4. How many rectangles 3 inches long and 1 inch wide can be made from it? How many rectangles 3 inches long and 2 inches wide?
5. How many 4 square inches in a four-inch square? How many 8 square inches? How many 2 square inches? 3 square inches? 5 square inches? 7 square inches? 6 square inches?
6. Draw a four-inch square.
7. Take away one row of square inches. How many square inches are left?
8. Take away two rows. How many square inches are left? Take away three rows. How many square inches are left?
9. Draw rectangles containing 16 square inches.
10. 4 and 12 are _____. $16 - 8 =$
    8 and 8 are _____. $16 - 4 =$
    6 and 10 are _____. $16 - 6 =$
    14 and 2 are _____. $16 - 2 =$
11. What part of 16 is 4? 12 is $\frac{3}{4}$ of ?
    What part of 16 is 8? 6 is $\frac{3}{8}$ of ?
    What part of 16 is 12? 4 is $\frac{1}{4}$ of ?
    What part of 16 is 2? 2 is $\frac{1}{8}$ of ?
    What part of 16 is 6? 8 is $\frac{1}{2}$ of ?

1. What are the dimensions of the yellow rectangle?
2. How many rows of 5 square inches are there in the rectangle? What part of the area is one row? Two rows?

1. How many rows of 4 square inches are there in the yellow rectangle? What part of the area is one row? Two rows? Three rows?
2. 1 square inch is what part of a four-inch row? Of a five-inch row? Of the entire area? 5 square inches are what part? 10 square inches? 8 square inches?
3. How many two-inch squares can be cut from the yellow rectangle? How many can be made from it?
4. How many three-inch squares can be made from the rectangle? How many four-inch squares?
5. If one row of 5 square inches were taken away from the yellow rectangle, how many square inches would be left? If two rows were taken away, how many square inches would be left?
6. If one row of 4 square inches were taken away from the yellow rectangle, how many square inches would be left? If two rows were taken away, how many square inches would be left?
7. Draw other rectangles containing 20 square inches.
8. 5 and 15 are _____. $20 - 15 =$
   10 and 10 are _____. $20 - 8 =$
   4 and 16 are _____. $20 - 10 =$
   8 and 12 are _____. $20 - 4 =$
9. What part of 20 is 5? 4 is $\frac{1}{5}$ of ?
   What part of 20 is 15? 12 is $\frac{3}{5}$ of ?
   What part of 20 is 4? 5 is $\frac{1}{4}$ of ?
   What part of 20 is 8? 8 is $\frac{2}{5}$ of ?
   What part of 20 is 10? 10 is $\frac{1}{2}$ of ?
   What part of 20 is 16? 15 is $\frac{3}{4}$ of ?



1. What are the dimensions of the green rectangle?
2. What is its area?
3. How many rows of 6 square inches are there in its surface? What part of its area is one row? Two rows? Three rows?
4. How many rows of 4 square inches are there in the rectangle? What part of its area is one row? Two rows? Three rows?
5. What part of the area of the rectangle is 1 square inch? What part is 2 square inches? 3 square inches? 4 square inches? 6 square inches?
6. How many two-inch squares can be cut from the green rectangle? How many three-inch squares? How many four-inch squares?
7. What rectangles can be cut or made from the green rectangle?
8. 12 and 12 are _____. $24 - 16 =$
   18 and 6 are _____. $24 - 12 =$
   14 and 10 are _____. $24 - 10 =$
   16 and 8 are _____. $24 - 6 =$
9. What part of 24 is 3? $\frac{1}{3}$ of 24 =
   What part of 24 is 4? $\frac{1}{6}$ of 24 =
   What part of 24 is 2? $\frac{1}{2}$ of 24 =
   What part of 24 is 12? $\frac{1}{8}$ of 24 =
   What part of 24 is 8? $\frac{1}{4}$ of 24 =
   What part of 24 is 6? $\frac{1}{12}$ of 24 =
10. How many 4's in 4? How many 4's in 16?
    How many 4's in 8? How many 4's in 20?
    How many 4's in 12? How many 4's in 24?
11. How many 5's in 5? How many 5's in 15?
    How many 5's in 10? How many 5's in 20?

Draw figures to illustrate areas of rectangles that are

2 inches by 2 inches. 1×4. 4×5. 4×6. 2×6.
3 inches by 3 inches. 5×2. 3×6. 2×10. 1×5.
4 inches by 2 inches. 4×4. 5×4. 1×6. 3×8.
3 inches by 4 inches. 5×3. 3×1. 4×3. 3×2.

What are the areas of rectangles that are

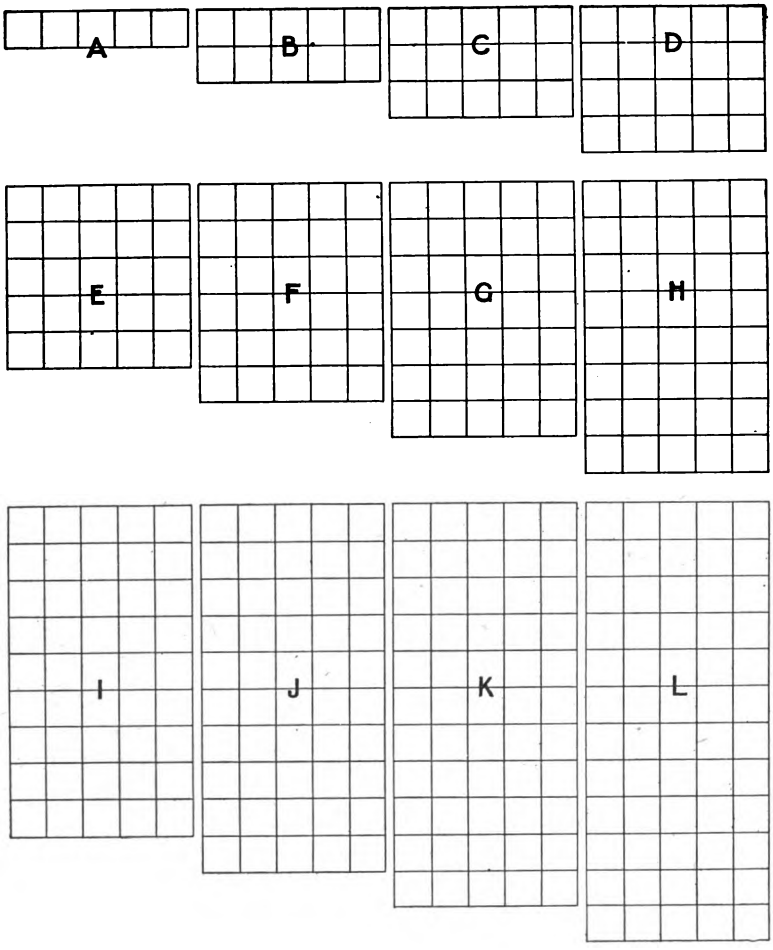
3 inches by 7 inches? 5×8? 4×10? 3×12?
4 inches by 7 inches? 3×9? 5×10? 4×12?
5 inches by 7 inches? 4×9? 3×11? 5×12?
3 inches by 8 inches? 5×9? 4×11? 5×5?
4 inches by 8 inches? 3×10? 5×11? 5×6?

What is the width of a rectangle that contains

4 square inches, and is 2 inches long?
6 square inches, and is 3 inches long?
9 square inches, and is 3 inches long?
12 square inches, and is 4 inches long?
8 square inches, and is 4 inches long?
24 square inches, and is 8 inches long?
10 square inches, and is 5 inches long?
18 square inches, and is 6 inches long?
12 square inches, and is 6 inches long?
24 square inches, and is 6 inches long?
16 square inches, and is 8 inches long?
18 square inches, and is 9 inches long?
14 square inches, and is 7 inches long?
24 square inches, and is 12 inches long?
15 square inches, and is 5 inches long?
20 square inches, and is 4 inches long?
25 square inches, and is 5 inches long?
30 square inches, and is 6 inches long?
20 square inches, and is 10 inches long?

1. Draw:
   - A line 1 inch long.
   - A line twice as long as the first line.
   - A line three times as long as the first line.
   - A line twice as long as the second line.
   - A square with each of its sides the length of the first line.
   - A square with each of its sides the length of the second line.
   - A square with each of its sides the length of the third line.
   - A square with each of its sides the length of the fourth line.
2. How many square inches are there in each square?
3. The area of the one-inch square equals what part of the area of the other squares?
4. The area of the two-inch square is how many times that of the one-inch square? It equals what part of the area of the three-inch square? Of the four-inch square?
5. The area of the three-inch square is how many times that of the one-inch square? Of the two-inch square? It equals what part of the area of the four-inch square?
6. The area of the four-inch square is how many times that of the other squares?
7. How many two-inch squares can be made from the three-inch square? From the four-inch square?

NOTE — By means of square measure, the tables may be taught; *i. e.*, how many square inches in a rectangle 2 by 2 inches, 2 by 3 inches, 2 by 4 inches? etc., or, how long is a rectangle that contains 4 square inches, and is 2 inches wide? That contains 6 square inches and is 2 inches wide?



1. Compare each figure with each of the other figures.
2. A is 5. How many 5's in B? How many in C? In D? E? F? G? H? I? J? K? L?
3. A equals 5, B equals 10. To what is C equal? D? E? F? G? H? I? J? K? L?

1. A equals what part of B? What part of C? Of D? E? F? G? H? I? J? K? L?
2. 5 is what part of 10? What part of 15? Of 20? 25? 30? 35? 40? 45? 50? 55? 60?
3. B equals how many A's? What part of C? Of D? E? F? G? H? I? J? K? L?
4. 10 is how many 5's? What part of 15? Of 20? 25? 30? 35? 40? 45? 50? 55? 60?
5. C equals how many A's? How many B's? What part of D? Of E? F? G? H? I? J? K? L?
6. 15 is how many 5's? How many 10's? What part of 20? Of 25? 30? 35? 40? 45? 50? 55? 60?
7. D equals how many A's? How many B's? How many C's? What part of E? Of F? G? H? I? J? K? L?
8. 20 is how many 5's? How many 10's? How many 15's? What part of 25? Of 30? 35? 40? 45? 50? 55? 60?
9. E equals how many A's? How many B's? How many C's? How many D's? What part of F? Of G? H? I? J? K? L?
10. 25 is how many 5's? How many 10's? How many 15's? How many 20's? What part of 30? Of 35? 40? 45? 50? 55? 60?
11. F equals how many A's? How many B's? How many C's? How many D's? How many E's? What part of G? Of H? I? J? K? L?
12. 30 is how many 5's? How many 10's? How many 15's? How many 20's? How many 25's? What part of 35? Of 40? 45? 50? 55? 60?
13. G equals how many A's? How many B's? Etc.

DRILL TABLES.

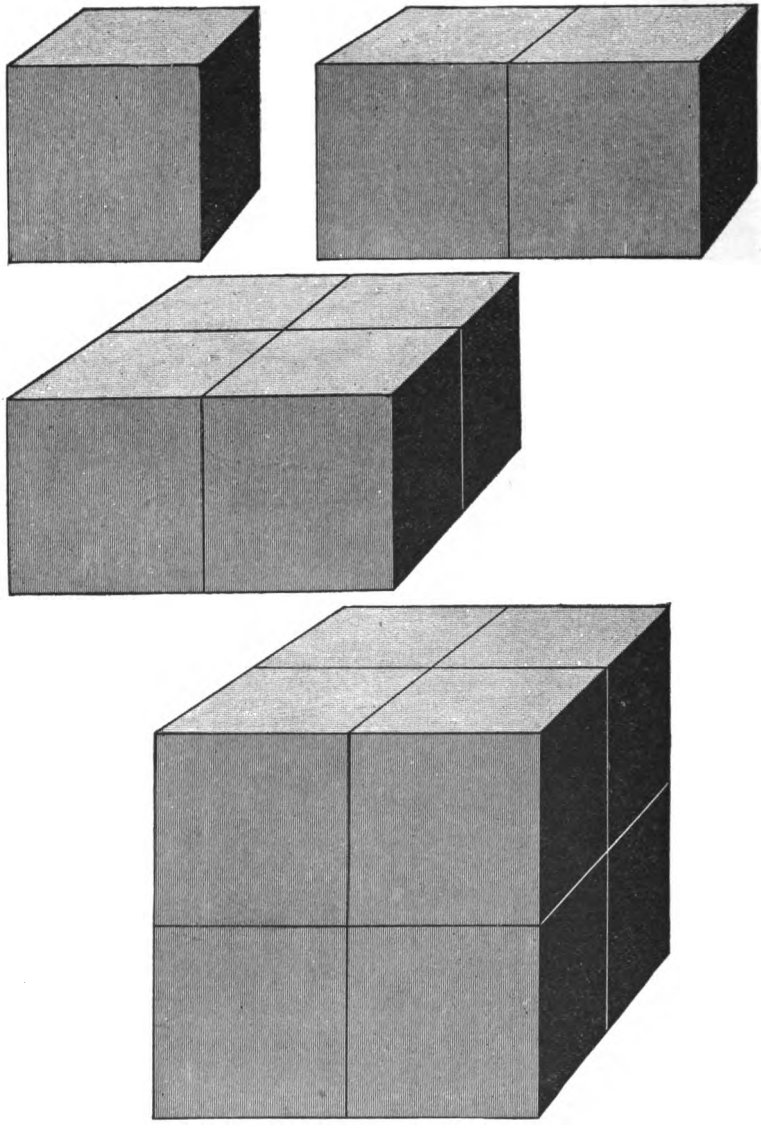
$2 \times 1 =$	$2 \div 2 =$	$\frac{1}{2}$ of $4 =$	$3 \times 2 =$
$2 \times 3 =$	$24 \div 2 =$	$\frac{1}{2}$ of $8 =$	$3 \times 12 =$
$2 \times 5 =$	$4 \div 2 =$	$\frac{1}{2}$ of $12 =$	$3 \times 4 =$
$2 \times 7 =$	$22 \div 2 =$	$\frac{1}{2}$ of $16 =$	$3 \times 10 =$
$2 \times 9 =$	$6 \div 2 =$	$\frac{1}{2}$ of $20 =$	$3 \times 6 =$
$2 \times 11 =$	$20 \div 2 =$	$\frac{1}{2}$ of $24 =$	$3 \times 8 =$
$2 \times 2 =$	$8 \div 2 =$	$\frac{1}{2}$ of $2 =$	$3 \times 1 =$
$2 \times 4 =$	$18 \div 2 =$	$\frac{1}{2}$ of $6 =$	$3 \times 11 =$
$2 \times 6 =$	$10 \div 2 =$	$\frac{1}{2}$ of $10 =$	$3 \times 3 =$
$2 \times 8 =$	$16 \div 2 =$	$\frac{1}{2}$ of $14 =$	$3 \times 9 =$
$2 \times 10 =$	$12 \div 2 =$	$\frac{1}{2}$ of $18 =$	$3 \times 5 =$
$2 \times 12 =$	$14 \div 2 =$	$\frac{1}{2}$ of $22 =$	$3 \times 7 =$

$3 \div 3 =$	$\frac{1}{3}$ of $6 =$	$\frac{2}{3}$ of $6 =$	$4 \times 1 =$
$9 \div 3 =$	$\frac{1}{3}$ of $12 =$	$\frac{2}{3}$ of $12 =$	$4 \times 3 =$
$15 \div 3 =$	$\frac{1}{3}$ of $18 =$	$\frac{2}{3}$ of $18 =$	$4 \times 5 =$
$21 \div 3 =$	$\frac{1}{3}$ of $24 =$	$\frac{2}{3}$ of $24 =$	$4 \times 7 =$
$27 \div 3 =$	$\frac{1}{3}$ of $30 =$	$\frac{2}{3}$ of $30 =$	$4 \times 9 =$
$33 \div 3 =$	$\frac{1}{3}$ of $36 =$	$\frac{2}{3}$ of $36 =$	$4 \times 11 =$
$6 \div 3 =$	$\frac{1}{3}$ of $3 =$	$\frac{2}{3}$ of $3 =$	$4 \times 2 =$
$12 \div 3 =$	$\frac{1}{3}$ of $9 =$	$\frac{2}{3}$ of $9 =$	$4 \times 4 =$
$18 \div 3 =$	$\frac{1}{3}$ of $15 =$	$\frac{2}{3}$ of $15 =$	$4 \times 6 =$
$24 \div 3 =$	$\frac{1}{3}$ of $21 =$	$\frac{2}{3}$ of $21 =$	$4 \times 8 =$
$30 \div 3 =$	$\frac{1}{3}$ of $27 =$	$\frac{2}{3}$ of $27 =$	$4 \times 10 =$
$36 \div 3 =$	$\frac{1}{3}$ of $33 =$	$\frac{2}{3}$ of $33 =$	$4 \times 12 =$

DRILL TABLES.

$8 \div 4 =$	$\frac{1}{4}$ of $4 =$	$\frac{3}{4}$ of $4 =$	$5 \times 1 =$
$16 \div 4 =$	$\frac{1}{4}$ of $12 =$	$\frac{3}{4}$ of $12 =$	$5 \times 4 =$
$24 \div 4 =$	$\frac{1}{4}$ of $8 =$	$\frac{3}{4}$ of $8 =$	$5 \times 2 =$
$32 \div 4 =$	$\frac{1}{4}$ of $16 =$	$\frac{3}{4}$ of $16 =$	$5 \times 5 =$
$40 \div 4 =$	$\frac{1}{4}$ of $24 =$	$\frac{3}{4}$ of $24 =$	$5 \times 3 =$
$48 \div 4 =$	$\frac{1}{4}$ of $32 =$	$\frac{3}{4}$ of $32 =$	$5 \times 6 =$
$4 \div 4 =$	$\frac{1}{4}$ of $20 =$	$\frac{3}{4}$ of $20 =$	$5 \times 9 =$
$12 \div 4 =$	$\frac{1}{4}$ of $28 =$	$\frac{3}{4}$ of $28 =$	$5 \times 7 =$
$20 \div 4 =$	$\frac{1}{4}$ of $36 =$	$\frac{3}{4}$ of $36 =$	$5 \times 8 =$
$28 \div 4 =$	$\frac{1}{4}$ of $48 =$	$\frac{3}{4}$ of $48 =$	$5 \times 12 =$
$36 \div 4 =$	$\frac{1}{4}$ of $40 =$	$\frac{3}{4}$ of $40 =$	$5 \times 10 =$
$44 \div 4 =$	$\frac{1}{4}$ of $44 =$	$\frac{3}{4}$ of $44 =$	$5 \times 11 =$

$10 \div 5 =$	$\frac{1}{5}$ of $5 =$	$\frac{2}{5}$ of $5 =$	$\frac{4}{5}$ of $5 =$
$25 \div 5 =$	$\frac{1}{5}$ of $20 =$	$\frac{2}{5}$ of $20 =$	$\frac{4}{5}$ of $20 =$
$40 \div 5 =$	$\frac{1}{5}$ of $10 =$	$\frac{2}{5}$ of $10 =$	$\frac{4}{5}$ of $10 =$
$5 \div 5 =$	$\frac{1}{5}$ of $25 =$	$\frac{2}{5}$ of $25 =$	$\frac{4}{5}$ of $25 =$
$20 \div 5 =$	$\frac{1}{5}$ of $15 =$	$\frac{2}{5}$ of $15 =$	$\frac{4}{5}$ of $15 =$
$55 \div 5 =$	$\frac{1}{5}$ of $30 =$	$\frac{2}{5}$ of $30 =$	$\frac{4}{5}$ of $30 =$
$15 \div 5 =$	$\frac{1}{5}$ of $60 =$	$\frac{2}{5}$ of $60 =$	$\frac{4}{5}$ of $60 =$
$30 \div 5 =$	$\frac{1}{5}$ of $35 =$	$\frac{2}{5}$ of $35 =$	$\frac{4}{5}$ of $35 =$
$45 \div 5 =$	$\frac{1}{5}$ of $55 =$	$\frac{2}{5}$ of $55 =$	$\frac{4}{5}$ of $55 =$
$35 \div 5 =$	$\frac{1}{5}$ of $40 =$	$\frac{2}{5}$ of $40 =$	$\frac{4}{5}$ of $40 =$
$60 \div 5 =$	$\frac{1}{5}$ of $50 =$	$\frac{2}{5}$ of $50 =$	$\frac{4}{5}$ of $50 =$
$50 \div 5 =$	$\frac{1}{5}$ of $45 =$	$\frac{2}{5}$ of $45 =$	$\frac{4}{5}$ of $45 =$



1. Place two one-inch cubes in a row.
2. Place another row of two one-inch cubes in front of the first row.
3. How many rows of one-inch cubes are there?
4. How many one-inch cubes, or cubic inches, are there in a row? How many are there in both rows?
5. Place four more one-inch cubes on top of these cubes.
6. How many layers of cubes are there?
7. How many cubic inches are there in a layer? How many are there in both layers?
8. Find a two-inch cube.
9. Build a two-inch cube with the one-inch cubes.
10. How many layers of one-inch cubes are there in the two-inch cube?
11. How many rows are there in each layer?
12. How many one-inch cubes are there in each row?
13. How many one-inch cubes are there in both rows?
14. How many one-inch cubes are there in both layers?
15. Take away one layer of cubes.
16. How many one-inch cubes are taken? What part of the two-inch cube is taken?
17. Take away one row from the remaining layer.
18. What part of the layer is taken? What part of the two-inch cube is taken?
19. Take away a one-inch cube from the remaining row.
20. What part of the row is taken? What part of the layer is taken? What part of the two-inch cube?
21. A one-inch cube is what part of a two-inch cube? Two one-inch cubes are what part? Three one-inch cubes are what part? Four are what part? Five?

(Refer to figures on page 68 and use solids.)

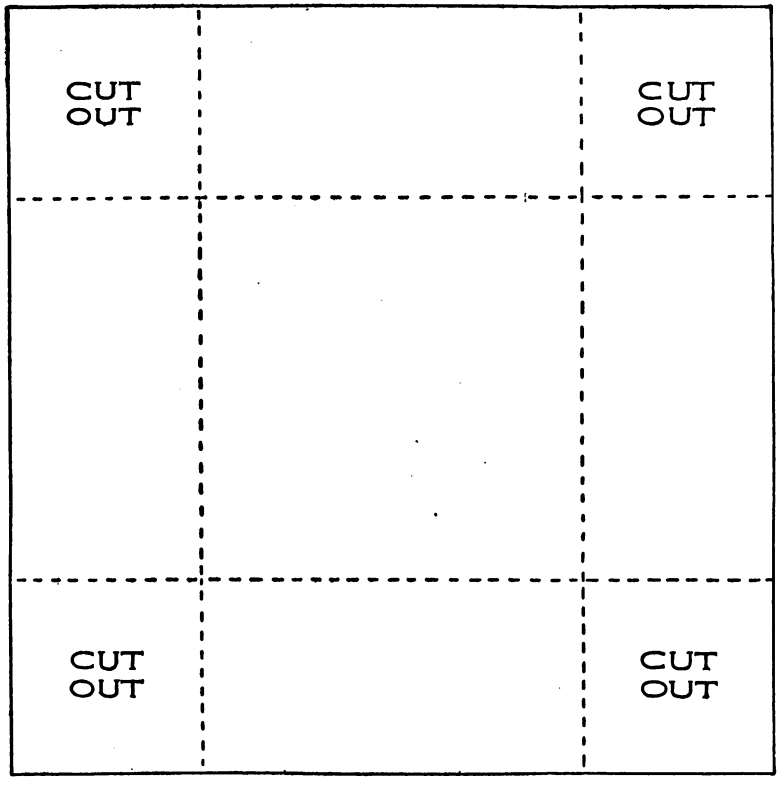
1. In a two-inch cube there are how many one-inch cubes?
2. In one-half of a two-inch cube there are how many one-inch cubes?
3. In one-half of one-half of a two-inch cube, how many one-inch cubes are there? What part of the two-inch cube are these one-inch cubes?
4. One-fourth is what part of one-half?
5. Point out one-fourth of the two-inch cube.
6. Point out three-fourths of the two-inch cube.
7. Point out one-third of three-fourths of the two-inch cube.
8. What part of the two-inch cube is one-third of three-fourths of it? What part is two-thirds of three-fourths of it?
9. What part of one-half of the two-inch cube is a one-inch cube? What part is two one-inch cubes? Three one-inch cubes?
10. What part of the two-inch cube is one-fourth of one-half of it? Two-fourths of one-half? Three-fourths of one-half?
11. One-eighth is what part of one-fourth?
12. One-eighth is what part of one-half?
13. One-eighth is what part of three-fourths?
14. Two-eighths are what part of three-fourths?
15. One-half equals how many fourths?
16. One-half equals how many eighths?
17. One-fourth equals how many eighths?
18. Three-fourths equal how many eighths?
19. One-third of three-fourths equals how many eighths?

1. Build with cubes a solid that is equal to two rows of 3 cubic inches.
2. What are its dimensions?
3. Build a solid that is equal to two layers of two rows of 3 cubic inches.
4. What are its dimensions?
5. Build the following solids, tell their dimensions, and the number of cubic inches in each:

   One layer of two rows of 3 cubic inches.
   Two layers of two rows of 3 cubic inches.
   One layer of two rows of 4 cubic inches.
   Two layers of two rows of 4 cubic inches.
   One layer of three rows of 5 cubic inches.
   Two layers of two rows of 5 cubic inches.
   Two layers of one row of 8 cubic inches.
   Two layers of one row of 7 cubic inches.
   Four layers of one row of 4 cubic inches.
   Two layers of one row of 6 cubic inches.
   Two layers of three rows of 3 cubic inches.
   Four layers of one row of 5 cubic inches.
   Three layers of two rows of 4 cubic inches.
   Four layers of three rows of 2 cubic inches.
   One layer of three rows of 8 cubic inches.
   Two layers of one row of 9 cubic inches.
   One layer of two rows of 12 cubic inches.
6. Give the dimensions of solids containing:

8 cubic inches.	12 cubic inches.
6 cubic inches.	10 cubic inches.
9 cubic inches.	16 cubic inches.

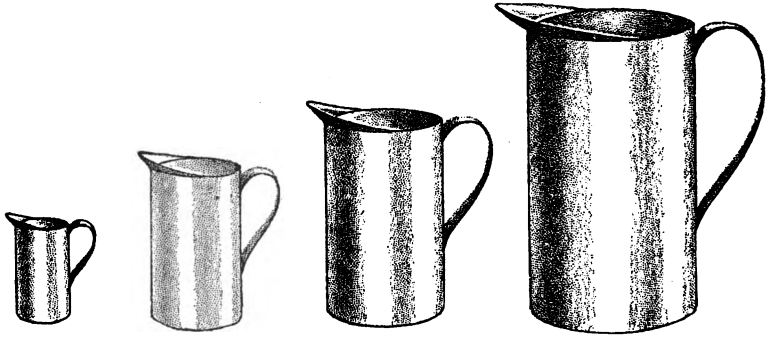
NOTE.—Have the pupils handle various solids and estimate their length, breadth, and height. After estimating, measure.



1. To make a box that will hold 4 cubic inches, draw a figure like the illustration. Cut out the corners, fold on dotted lines, and paste the square pieces cut from the corners, over the joinings.
2. Make a box that will hold

6 cubic inches.	15 cubic inches.
8 cubic inches.	16 cubic inches.
10 cubic inches.	18 cubic inches.
12 cubic inches.	20 cubic inches.
14 cubic inches.	24 cubic inches.

1. A box is three inches long, two inches wide, and two inches high. How many cubic inches will it hold?
2. How wide is a box that contains eight cubic inches, and is two inches high and two inches long?
3. How long is a box that contains sixteen cubic inches, and is two inches wide and two inches high?
4. How high is a box that contains twelve cubic inches, and is two inches long and two inches wide?
5. A brick six inches long and two inches wide contains twenty-four cubic inches. How thick is it?
6. A bin is four feet long, two feet wide, and four feet high. How many cubic feet does it contain?
7. In a block of marble there are sixteen cubic feet. It is four feet long and two feet wide. How high is it?
8. A book is six inches long, four inches wide, and one inch thick. How many cubic inches are there in it?
9. How many cubic feet will a glass case hold that is five feet high, two feet wide, and two feet long?
10. How many cubic yards are there in a room that is three yards long, two yards wide, and three yards high?
11. A ditch is four feet wide and three feet deep. How many cubic feet are there in a part two feet long? How many in a part three feet long?
12. How many cubic yards will a wagon box hold that is three yards long, two yards wide and one yard high?
13. How many cubic feet are there in a pile of wood four feet long, two feet wide, and two feet high?



1 gill

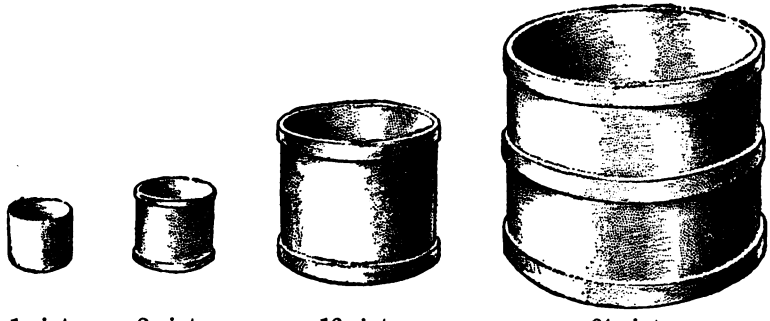
4 gills
1 pint

8 gills
2 pints
1 quart

32 gills
8 pints
4 quarts
1 gallon

1. What is sold by the gill?
2. Measure and find how many gills in a pint.
3. One pint equals how many gills?
4. One gill equals what part of a pint? Two gills equal what part? Three gills equal what part?
5. One and one-half pints equal how many gills?
6. If a pint of water weighs a pound, how much will a gill weigh? How much will three gills weigh?
7. What is sold by the pint and quart?
8. Measure and find how many pints in a quart.
9. One quart equals how many pints?
10. One pint equals what part of a quart?
11. How many gills are there in one-half of a quart? How many are there in a quart?
12. One and one-half quarts equal how many pints?
13. If a pint of water weighs a pound, how much will a quart weigh?
14. What is sold by the gallon?
15. Measure and find how many quarts in a gallon.

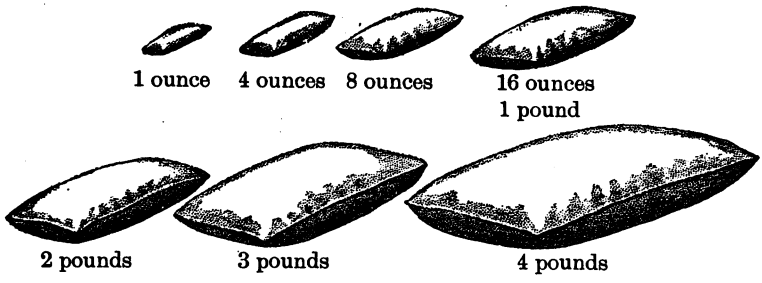
1. One gallon equals how many quarts?
2. One quart equals what part of a gallon? Two quarts equal what part? Three quarts equal what part?
3. One and one-half gallons equal how many quarts?
4. If a quart of water weighs two pounds, how much will a gallon weigh?
5. How many quarts are there in one-half of a gallon? In one-fourth?
6. How many pints are there in one-fourth of a gallon? How many are there in a gallon?
7. How many gills are there in one-fourth of a gallon?
8. Tell how many gills equal two pints; one and one-half pints; two quarts.
9. Tell how many pints equal three quarts; two and one-half quarts; two gallons.
10. Tell how many quarts equal two gallons.
11. At 24 cents a quart, how much will a pint of molasses cost?
12. How much will a gallon of milk cost at 6 cents a quart?
13. How much will a quart of cream cost at 4 cents a gill?
14. A can holds twelve quarts; how many gallons will it hold?
15. How many quarts does a three-gallon jug hold?
16. How many quarts of milk are there in sixteen pints? In twenty pints? In twenty-four pints?
17. A boy had two gallons of mineral water, and sold four pints of it. How many pints had he left? How many gallons?



1 pint | 2 pints, 1 quart | 16 pints, 8 quarts, 1 peck | 64 pints, 32 quarts, 4 pecks, 1 bushel

1. What articles are sold by the bushel?
2. Find by measuring how many pecks there are in a bushel.
3. One peck equals what part of a bushel?
4. One-half of a bushel equals how many pecks? One-fourth of a bushel equals how many pecks? Three-fourths equal how many pecks?
5. How many pecks are there in one and one-half bushels?
6. Find by measuring how many quarts there are in one peck.
7. One quart equals what part of a peck?
8. Put four quarts into the peck measure. Tell what part of the measure is filled.
9. Two quarts equal what part of a peck? Six quarts equal what part?
10. How many quarts are there in one and one-half pecks?
11. How many quarts fill a bushel measure?
12. One quart equals what part of a bushel?

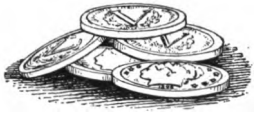
1. How many pints are there in a quart? In eight quarts? In thirty-two quarts?
2. How many pints are there in a peck? In one-half of a peck? In one-fourth of a peck?
3. How many bushels do twelve pecks equal? Sixteen pecks? Twenty pecks?
4. How many pecks do sixteen quarts equal? Thirty-two quarts?
5. At 8 cents a quart, what will six pints of cranberries cost?
6. If cherries cost 10 cents a quart, what will one-half of a peck cost?
7. A boy picked one and one-half bushels of cherries. He sold them by the peck; how many pecks did he sell? How many dollars did he receive for them at one-half dollar for a peck?
8. How many bags holding one bushel each will be required to hold twenty-four pecks of corn? How many holding two bushels each will be required?
9. At 4 cents a quart what will a peck of beans cost? What will three-fourths of a peck cost?
10. If there are ten bushels of wheat in a bin and twenty pecks are taken out, how many pecks are left? How many bushels are left?
11. A man can dig five bushels of potatoes in one hour. How many pecks can he dig in two hours?
12. If oats cost 30 cents a bushel, what will two pecks cost?
13. A can holds sixteen quarts of berries. Ten pints of berries are taken out; how many pints are left? How many quarts are left?



1. One pound equals how many ounces?
2. The one-ounce weight equals what part of the pound weight?
3. Two one-ounce weights together equal what part of the pound weight?
4. The four-ounce weight equals what part of the pound weight?
5. The eight-ounce weight equals what part of the pound weight?
6. The four-ounce weight and the eight-ounce weight together equal what part of the pound weight?
7. The four-ounce weight and two one-ounce weights together equal what part of the pound weight?
8. The eight-ounce weight and two one-ounce weights together equal what part of the pound weight?
9. What part of the two-pound weight does a one-ounce weight equal? A four-ounce weight? An eight-ounce weight?
10. Four eight-ounce weights together equal which other weight?

NOTE.—Have bean bags of different sizes holding exact weights, as, four pounds, three pounds, two pounds, one pound, eight ounces, four ounces; also, sixteen one-ounce weights. Have the pupils estimate the relation of the weights by handling.

1. Which three weights together equal one pound? Which six weights? Which nine weights?
2. Which three weights together equal two pounds? Which four weights? Which six weights?
3. Give three ways in which these weights may be combined to equal three pounds. Four pounds.
4. At 6 cents a pound, what will three and one-half pounds of sugar cost?
5. How many four-ounce packages can be made from three pounds of tea?
6. How many jars, each holding twelve ounces, can be filled from one and one-half pounds of butter?
7. What is the weight in ounces of two packages of tea, one holding three-fourths of a pound, and the other one-half of a pound?
8. A man bought two pounds of salt and used twenty-four ounces of it. How many ounces had he left? What part of a pound had he left?
9. If cinnamon costs 10 cents an ounce, what will half a pound cost?
10. What will two ounces of sunflower seed cost at 40 cents a pound?
11. If one pound of coffee costs 36 cents, what will eight ounces cost?
12. What will one pound and four ounces of canary seed cost at 2 cents an ounce?
13. If one pound of butter costs 24 cents, what will four ounces cost? Twelve ounces?
14. A man bought two pounds of rice, and sold it in eight-ounce packages, at 3 cents a package. How much did he receive for the rice?



5 nickels

5 cents

5 dimes

4 quarters

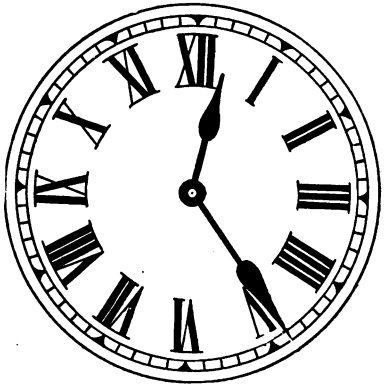
1 dollar

2 half-dollars

1. How many cents equal a nickel?
2. How many nickels equal a dime? How many cents equal a dime?
3. How many nickels equal a quarter? How many cents equal a quarter?
4. How many quarters equal a half-dollar? How many dimes equal a half-dollar? How many nickels equal a half-dollar?
5. How many half-dollars equal a dollar? How many quarters equal a dollar? How many dimes?
6. Which two pieces of money equal a dime?
7. Which three pieces of money equal a quarter?
8. Which two pieces of money equal seventy-five cents? Which three pieces?
9. Which two pieces of money equal a dollar? Which three pieces? Which four pieces?
10. To how many quarters are two dollars equal? Four dollars? Five and one-half dollars?
11. To how many half-dollars are six quarters equal?

1. A boy bought a top for 25 cents, and paid for it in nickels. How many nickels did he spend for it?
2. A book worth 30 cents is bought with a half-dollar. How many dimes are needed to make the correct change?
3. A package of flower seed costs 10 cents. How many quarters will pay for five packages? How many dimes?
4. How many 5-cent car fares can be paid with a quarter? With 15 cents?
5. Harry has 5 dimes in his bank; John has 1 quarter and 2 dimes in his. Which has the more money?
6. At 10 cents each, how many balls can be bought for a quarter, a dime and a nickel together?
7. A pound of candy costs 50 cents. How much can be bought for 1 dollar? For 25 cents? For 75 cents? For 5 cents?
8. How many 50 cents will pay for a chair that costs 5 dollars?
9. A sled costs $1\frac{1}{2}$ dollars. How many 25 cents will be required to pay for it?
10. Joe bought a book for 30 cents, paper for 25 cents, and two pencils at 10 cents each. What did he pay for all? What two pieces of money would pay for them? What three pieces?
11. If a gill of cream costs a nickel, how many dimes will pay for a quart?
12. If three dimes pay for a bushel of oats, how many nickels will pay for two pecks?
13. If one pound of seed costs a dollar, what part of a dollar will pay for four ounces?

1. Name the days of the week.
2. How many days are there in one week? In two weeks? In three weeks? In four weeks?
3. What part of the week is one day? Two days?
4. How many school days are there in one week? In three weeks? In five weeks?
5. How many days of the week are not school days?
6. What part of the week is the school days?
7. How many days of the week are called working days?
8. What part of the week is the working days?
9. How many weeks are there in a month?
10. One week is what part of a month? Two weeks are what part? Three weeks are what part?
11. Name the months of the year beginning with January.
12. How many months are there in the year?
13. What part of the year is one month? Two months? Six months?
14. What part is the winter months? The spring months? The summer months? The autumn months?
15. During what months is school held?
16. What part of the year is school held?
17. During what months is there vacation?
18. What part of the year is there vacation?
19. How many hours are there in a day? In two days?
20. What part of a day is one hour? What part is two hours? Four hours? Eight hours? Twelve hours?
21. How many hours are called "day"? How many are called "night"?



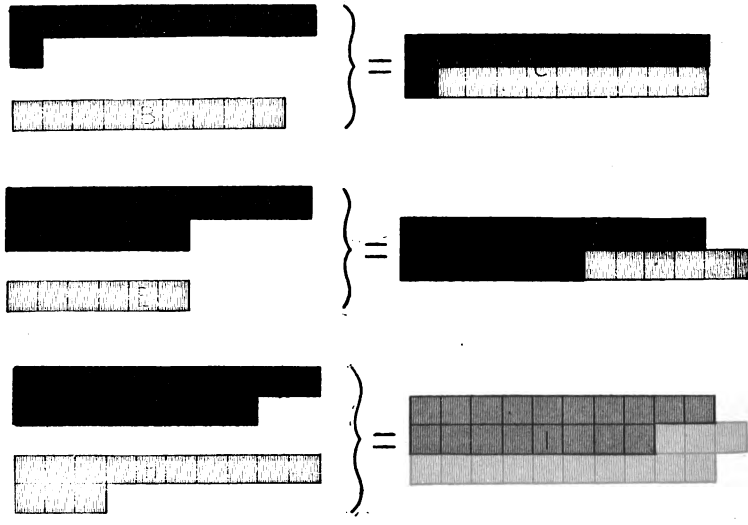
1. Draw the face of a clock, and fasten to the center two movable hands.
2. Show how far the minute hand moves in an hour. Show how far the hour hand moves in an hour.
3. How many minutes are there in an hour?
4. How many minutes are there in half an hour? How many in one-fourth, or one-quarter, of an hour?
5. Show where the hands are at one o'clock.
6. Show where the hands are at thirty minutes after one, or half past one.
7. Show where the hands are at fifteen minutes after one, or quarter past one.
8. Move the hands to show the time of the opening of school in the morning; the beginning of recess; the closing of school at noon; the opening and closing of school in the afternoon.
9. If recess lasts fifteen minutes, what part of an hour does it last?
10. If a man works eight hours a day, what part of a day does he work?
11. A boy starts for school at twenty minutes after eight and arrives there at ten minutes to nine. How long is he on the way?
12. George went to school eight months one year. What part of the year did he attend?

1. A train leaves one station at ten minutes after twelve, and arrives at the next at half past twelve; how many minutes does it take to go from one station to the other? What part of an hour?
2. A man closes his store and starts for home at six o'clock. He walks home in a quarter of an hour. What time is it when he arrives?
3. A man begins work at eight o'clock, and stops at half past five. How many hours a day does he work if he stops an hour at noon?
4. Mary is six years old and Jennie is six and three-fourth years old. How many months older is Jennie than Mary?
5. School begins at nine o'clock and closes at half past three. How many hours are there between the opening and the closing? An hour and a half are allowed at noon, and half an hour for recesses; how many hours are the pupils in school during one day?
6. A farmer owned eighteen horses. He sold six; how many had he left? What part had he left?
7. A man mailed nine letters at one time and six at another. How many did he mail altogether?
8. From a bunch of eighteen bananas, nine bananas were sold. How many remained on the bunch?
9. There were twenty sheep in one pen, and ten in another. How many in both? If five were taken out, how many remained in the pens?
10. A boy paid a dime for a bat, and a nickel for a ball. How many cents did he pay for both?

1. How long a string will reach around the frame of a slate, that is twelve inches long and eight inches wide?
2. A box two inches high is twice as wide as it is high. How wide is it? Its length equals the sum of its width and height. How long is it?
3. By cleaning walks, Edwin earned a quarter on Monday, a dime on Tuesday, and a nickel on Wednesday. How much did he earn in the three days?
4. One jar holds four pints, another holds six pints. How many pints do both hold? How many quarts do both hold?
5. A ship leaves one port at noon on Monday and arrives at her next port at noon on Friday. How many days was she on the way?
6. In a class of nineteen pupils there was one more girl than there were boys. How many girls and boys were there in the class?
7. A car goes eight miles an hour. How many hours will it take to go twelve miles? Twenty miles? Sixteen miles? Twenty-four miles?
8. Sixteen acres of land are divided into two equal fields. How many acres are there in each field?
9. When it is a quarter past nine o'clock, how many minutes past nine is it?
10. How many pints of oil are there in a can holding twelve quarts?
11. A table is four feet long and two feet wide. What is the length of its perimeter? What is its area?
12. A piece of sidewalk seven feet long contains twenty-eight square feet. How wide is it?

1. If a peck of beans costs 40 cents, what will one quart cost?
2. How many four-quart pails can be filled from seventeen quarts of milk? How many quarts will be left?
3. A man started for town at ten minutes to nine, and arrived at twenty minutes after nine. How many minutes was he on the way? What part of an hour was he on the way?
4. A garden five rods long is one-half as wide as it is long. How many rods of fence will be required to inclose it?
5. A grocer bought one tub of butter containing ten pounds, and another containing five pounds. How many pounds did he buy? How many jars holding five pounds each could he fill with the butter?
6. Three five-dollar bills equal how many dollars? Four five-dollar bills? Five ten-dollar bills?
7. When 16 cents are paid for twelve eggs, how many cents must be paid for six eggs?
8. There are twenty days of school in a month. Louis was absent five days. What part of the school month was he absent?
9. How many shoes at 2 dollars a pair can be bought for 15 dollars? How much money will be left?
10. The rent of one house is 30 dollars a month; the rent of another is one-half as much. What is the rent of the second house? Of both houses?
11. One side of a signboard contains thirty-six square feet. If the signboard is six feet high, how wide is it? If it is nine feet high, how wide is it?

1. From a jug holding one gallon of syrup, one quart and one pint are taken. How much syrup is left in the jug?
2. How many bags holding six pecks each will be required to hold six bushels of corn?
3. A train leaves one station at fifteen minutes after one and arrives at the next station half an hour later. At what time does it reach the second station?
4. What is the weight of three packages, two of which weigh ten ounces each, and one, five ounces?
5. A rectangular field containing sixty square yards, is twelve yards long. How wide is it?
6. If one pound of coffee costs 32 cents, what will four ounces cost?
7. A boy left home at eight o'clock in the morning and returned at noon. How many hours was he away? What part of the day was he away?
8. If a rope is cut into four equal parts, and each part is three feet long, what was the length of the entire rope?
9. In a basket of fruit there are two dozen pears. If half a dozen are taken out, how many will be left?
10. The glass in a picture frame is two feet wide and three feet long. How many square feet are there in its surface?
11. A clock is fifteen minutes fast. What is the correct time when the clock says half past three?
12. With what three pieces of money can five 3-cent car fares be paid?
13. If one peck of potatoes costs 25 cents, what will three pecks cost? Four pecks?



1. How many squares are there in A?
2. How many figures are used in writing the number?
3. How many squares are there in B?
4. How many figures are used in writing the number?
5. How many figures will represent C? D? E? F? G? H? I?
6. How many 10's in A and how many over?
7. How many 10's in C?
8. How many 10's in D and how many over? In F? In G? In H? In I?
9. Write 3 tens; 4 tens; 6 tens; 5 tens; 2 tens; 8 tens.
10. Write:

3 tens and 1.	2 tens and 7.	2 tens and 9.
4 tens and 2.	3 tens and 7.	5 tens and 1.
5 tens and 6.	5 tens and 8.	6 tens and 4.
7 tens and 5.	8 tens and 2.	9 tens and 1.

1. Add A and B.

   A equals one 10 and 1, or 11.

   B equals 9.

   Place the 9 squares of B beside the 1 of A and what do we have?

   C is the sum of A and B.

A=	11
B=	9
C=	20

2. Add D and E.

   Place E beside the 6 of D and what do we have?

   F is the sum of D and E.

D=	16
E=	6
F=	22

3. Add G and H.

   Place the 3 of H by the 8 of G and what do we have?

   I is the sum of G and H.

G=	18
H=	13
I=	31

4. Add:

A and D, 11 16	A and G, 11 18	A and H, 11 13
D and H, 16 13	C and D, 20 16	C and G, 20 18
C and H, 20 13	A and F, 11 22	A and E, 11 6
D and F, 16 22	G and I, 18 31	H and I, 13 31

5. Read the following numbers: 21, 32, 44, 56, 27, 46, 29, 45, 64, 36, 25.
6. Which figure tells how many tens in each number?
7. The other figure we will call ones, as 1, 2, 4, 6, 7, etc.

1. Add: 11
19

10 9 ones and 1 are 10, or 1 ten.
2 1 ten and 1 ten are 2 tens.
30 2 tens and 1 ten are 3 tens or 30.

2. Add: 15
18

13
2

33

3. Add: 26
45

11
6

71

4. Add: 34
29

13
5

63

5. Add: 47
39

16
7

86

6. Add:

26	17	53	34	28	25	18	32
14	37	18	27	14	26	35	29
65	76	57	39	68	53	27	46
28	16	15	48	27	29	67	39
28	35	26	14	37	49	19	16
34	15	34	49	23	33	12	59
16	46	38	29	28	15	67	28
46	34	25	32	54	37	24	34

1. Write 11 tens. Read. How many hundreds?
   Write 12 tens. Read. How many hundreds and how many tens over?
   Write 15 tens. Read. How many hundreds and how many tens over?
   Write 4 tens and 4.
   Write 14 tens and 4. Read. How many hundreds, tens, and ones.

2. Add: 47
   63
   10 3 and 7 are 10, or 1 ten.
   10 6 tens and 4 tens are 10 tens.
   110 10 tens and 10 are 110.

3. Add:
   276
   359
   15
   12
   5
   635

4. Add:
   427
   398
   15
   11
   7
   825

5. Add:

32	49	76	58	85	67	94	23
88	63	25	72	47	54	36	99
97	86	78	63	58	47	85	46
64	57	59	88	94	87	76	76
44	54	55	54	143	354	145	252
32	35	34	45	342	435	514	145
45	43	25	54	235	143	152	243

1. A farmer kept fifteen sheep in one field, twenty-four in another, thirty-one in another, and forty-three in another. How many sheep did he have in all the fields?
2. George earned 53 dollars in the winter, 43 dollars in the spring, 25 dollars in the summer, and 34 dollars in the fall. How many dollars did he earn in the whole year?
3. A girl paid 35 cents for a book, 15 cents for paper, 3 cents for a ruler, and 23 cents for a box of paints. How much did she pay for all?
4. A man traveled one hundred thirty-five miles the first week, two hundred fifty-four miles the second week, and five hundred forty-one miles the third week. How far did he travel in the three weeks?
5. I paid 135 dollars for a horse, 154 dollars for a carriage, and 23 dollars for a harness. How much did they all cost me?
6. How long a line will it take to go around a house that is thirty-six feet long and twenty-eight feet wide?
7. A man had 16 dollars, which was 15 dollars less than he needed to buy a suit of clothes. What was the price of the suit?
8. Arthur earns 12 dollars in one month and William 10 dollars. If their father earns as much as both of them how much does he earn? How much do the three earn?
9. Mr. Stone bought a lot for 354 dollars. He built a fence around it at a cost of 103 dollars. What did the whole cost?

1. From 43 54 67 89 354 597 728
   Take 11 21 34 45 142 423 415
   32

2. Read 25, 37, and 78 as follows:
   25=2 tens and 5 ones. (20+5.)
   1 ten and 15 ones. (10+15.)
   37=3 tens and 7 ones. (30+7.)
   2 tens and 17 ones. (20+17.)
   78=7 tens and 8 ones. (70+8.)
   6 tens and 18 ones. (60+18.)

3. Read in the same way 32, 46, 54, 48, 67, 34, 74.

4. From 72 take 35.
   72=60+12
   35=30+ 5
   30+ 7=37
   5 ones cannot be taken from 2 ones. Change 72 to 6 tens and 12 ones. 5 ones from 12 ones are 7; 3 tens from 6 tens are 3 tens.

5. From 92 take 44.
   92=80+12
   44=40+ 4
   40+ 8=48

6. From 131 take 43.
   131=120+11
   43= 40+ 3
   80+ 8=88

7. Subtract:

30	40	80	32	42	53	72	61
13	15	24	13	14	24	45	22
71	94	81	91	84	62	73	82
13	45	54	45	25	33	15	54
250	361	454	583	892	951		
123	143	235	354	443	243		

1. A man borrowed 73 dollars and returned 54 dollars. How much did he still owe?
2. In the morning there were ninety-one pounds of sugar in a barrel, and in the evening there were forty-three pounds. How many pounds had been taken out during the day?
3. A boy earned 82 dollars and spent 25 dollars for a bicycle. How much money had he left?
4. One book contains three hundred eighty-two pages and another two hundred thirty-five pages. How many more pages are there in the first book than in the second?
5. A farmer sold a horse for 160 dollars, which was 24 dollars more than it cost. What was the cost of the horse?
6. It requires ninety feet of molding to go around a parlor and sixty-three feet to go around a dining-room. How much more is required for the parlor than for the dining-room? How much is required for both rooms?
7. Clara's purse contains 63 cents. If she spends 46 cents for a book, how much money will there be left?
8. In one school-room, there are six hundred seventy-two books; in another school-room, two hundred forty-three books. How many more books in the first room than in the second?
9. A cistern that will hold one hundred fifty-two barrels of water has only forty-three barrels in it. How many barrels of water will be required to fill it?

1. Multiplication is the addition of equal numbers.

2. How many are two 47's, or 2 times 47?

47		47	
47		2	
14	or	14	Two 7's are 14, or 1 ten and 4 ones.
8		8	Two 4 tens are 8 tens.
94		94	8 tens and 14 are 94.

3. How many are three 58's, or 3 times 58?

58			
58		58	
58	or	3	
24		24	Three 8's are 24.
15		15	Three 5 tens are 15 tens.
174		174	15 tens and 24 are 174.

4. Multiply:

36	28	57	38	76	41	45	79
2	3	2	4	3	5	4	2
26	89	93	88	67	80	78	90
5	4	3	2	4	3	5	4

5. How many are four 243's, or 4 times 243?

243	
4	
12	Four 3's are 12.
16	Four times 4 tens are 16 tens.
8	Four times 2 hundreds are 8 hundreds.
972	Adding, 6 tens and 1 ten are 7 tens, 8 hundreds and 1 hundred are 9 hundreds, making 972.

1. Multiply:

325	438	147	235	268	470	138	167	295
3	2	5	4	3	2	5	4	2
179	489	249	304	169	230	294	157	109
3	2	4	3	5	4	3	5	4

2. A gardener set out four rows of trees, putting eighty-two trees in each row. How many trees did he set out?
3. If a person pays 4 dollars a week for board, how much will he pay in a year, or fifty-two weeks?
4. There are twenty-four sheets of paper in a quire. How many sheets are there in five quires?
5. How many bushels of wheat are there in ninety-six bags, if each bag contains two bushels?
6. What will three pianos cost at 285 dollars each?
7. A family uses thirty-eight quarts of milk in a month. How much will the milk bill amount to at 5 cents a quart?
8. There are one hundred ninety-six pounds of flour in a barrel. How many pounds in four barrels?
9. Mr. Gates sold his horse for 87 dollars. I sold mine for one-third as much. How much did I receive for my horse?
10. If Mr. Field pays 36 dollars for one month's rent, what will his rent be for five months?
11. One hundred ninety-six loaves of bread can be made from a barrel of flour. How many loaves can be made from five barrels of flour?
12. Dr. Allen pays 75 dollars a year for his telephone. What will it cost him for four years?

1. What is $\frac{1}{2}$ of 42?

$2)\underline{42}$ In 42 there are 4 tens and 2 ones. $\frac{1}{2}$ of 4
$\underline{21}$ tens is 2 tens; $\frac{1}{2}$ of 2 ones is 1.
$\frac{1}{2}$ of 42 is 2 tens and 1, or 21.

2. Find:

$\frac{1}{2}$ of 24	$2)\underline{24}$	$\frac{1}{2}$ of 28	$2)\underline{28}$	$\frac{1}{2}$ of 60	$2)\underline{60}$
$\frac{1}{3}$ of 36	$3)\underline{36}$	$\frac{1}{3}$ of 63	$3)\underline{63}$	$\frac{1}{3}$ of 39	$3)\underline{39}$
$\frac{1}{3}$ of 66	$3)\underline{66}$	$\frac{1}{3}$ of 93	$3)\underline{93}$	$\frac{1}{3}$ of 96	$3)\underline{96}$
$\frac{1}{4}$ of 48	$4)\underline{48}$	$\frac{1}{4}$ of 84	$4)\underline{84}$	$\frac{1}{4}$ of 44	$4)\underline{44}$
$\frac{1}{4}$ of 80	$4)\underline{80}$	$\frac{1}{4}$ of 88	$4)\underline{88}$	$\frac{1}{4}$ of 120	$4)\underline{120}$
$\frac{1}{5}$ of 55	$5)\underline{55}$	$\frac{1}{5}$ of 50	$5)\underline{50}$	$\frac{1}{5}$ of 155	$5)\underline{155}$

3. Read 32, 54, and 88 as follows:

32=3 tens and 2 (30+2).
2 tens and 12 (20+12).
1 ten and 22 (10+22).

54=5 tens and 4 (50+4).
4 tens and 14 (40+14).
3 tens and 24 (30+24).
2 tens and 34 (20+34).
1 ten and 44 (10+44).

88=8 tens and 8 (80+8).
6 tens and 28 (60+28).
5 tens and 38 (50+38).
4 tens and 48 (40+48).
3 tens and 58 (30+58).
2 tens and 68 (20+68).
1 ten and 78 (10+78).

1. Read in as many ways as possible, 34, 56, 72, 46, 68, 81, 96, 45, and 115.

2. What is one-half of thirty-two marbles?

$2)\underline{32=20+12}$ We cannot find $\frac{1}{2}$ of 3 tens evenly.

$10+\ 6=16$ Change 32 to 2 tens and 12. $\frac{1}{2}$ of 2 tens is 1 ten; $\frac{1}{2}$ of 12 is 6.

3. A boat sailed fifty-four miles in two hours; how far did it sail in one hour?

In one hour it sailed $\frac{1}{2}$ of 54 miles.

$2)\underline{54=40+14}$ Change 54 to 4 tens and 14. $\frac{1}{2}$

$20+\ 7=27$ of 4 tens is 2 tens; $\frac{1}{2}$ of 14 is 7.

4. Seventy-five apples are separated into three equal piles. How many apples are there in each pile?

In each pile there are $\frac{1}{3}$ of 75 apples.

$3)\underline{75=60+15}$ Change 75 to 6 tens and 15. $\frac{1}{3}$

$20+\ 5=25$ of 6 tens is 2 tens; $\frac{1}{3}$ of 15 is 5.

5. Find:

$\frac{1}{2}$ of 98	$2)\underline{98}$	$\frac{1}{3}$ of 42	$3)\underline{42}$	$\frac{1}{2}$ of 54	$2)\underline{54}$
$\frac{1}{3}$ of 51	$3)\underline{51}$	$\frac{1}{4}$ of 92	$4)\underline{92}$	$\frac{1}{5}$ of 75	$5)\underline{75}$
$\frac{1}{4}$ of 68	$4)\underline{68}$	$\frac{1}{5}$ of 75	$5)\underline{75}$	$\frac{1}{4}$ of 56	$4)\underline{56}$

6. Ninety-six marbles are divided equally among four boys. How many marbles has each boy?

Each boy has $\frac{1}{4}$ of 96 marbles.

$4)\overset{8,16}{\underline{96}}$ Change 96 to 8 tens and 16. $\frac{1}{4}$ of 8 tens

24 is 2 tens; $\frac{1}{4}$ of 16 is 4.

1. There are one hundred fifteen scholars in five equal classes. How many scholars are there in each class?

   In each class there are $\frac{1}{5}$ of 115 scholars.

   $5\overset{10,15}{)}115$ — 23

   Change 115 to 10 tens and 15. $\frac{1}{5}$ of 10 tens is 2 tens; $\frac{1}{5}$ of 15 is 3.

2. There are one hundred forty-four trees in four equal rows. How many trees are there in each row?

   In each row there are $\frac{1}{4}$ of 144 trees.

   $4\overset{12,24}{)}144$ — 36

   Change 144 to 12 tens and 24. $\frac{1}{4}$ of 12 tens is 3 tens; $\frac{1}{4}$ of 24 is 6.

3. A man walks three miles an hour. At the same rate, how many hours will it take him to walk one hundred sixty-two miles?

   It will take as many hours as there are 3's in 162.

   $3\overset{15,12}{)}162$ — 54

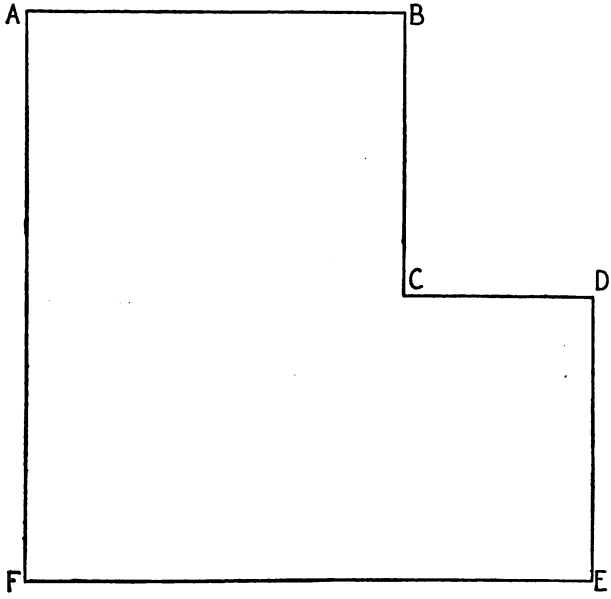
   Read 162 as 15 tens and 12. There are 50 3's in 15 tens; there are 4 3's in 12. 50 and 4 are 54.

4. Divide:

2)178	3)171	4)172	5)175	2)366	4)896	5)150
5)345	4)180	3)294	2)250	3)426	2)548	4)188
3)678	5)470	2)478	4)272	5)215	3)519	2)672
4)372	3)987	5)595	2)636	4)524	5)755	3)648
4)336	5)435	2)946	3)819	4)296	5)375	3)201

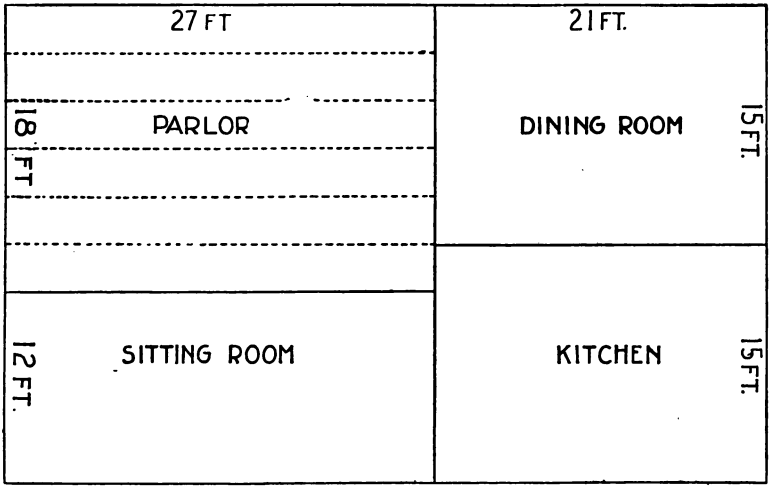
1. What is the cost of one lot, if three lots cost 516 dollars?
2. A farmer has three hundred fifteen bushels of potatoes. If he puts them in barrels, each holding three bushels, how many barrels will he need?
3. A steamboat makes a trip of eight hundred forty-three miles in three days. How many miles does it run in one day?
4. A clerk, selling cloth at 2 dollars a yard, received 506 dollars in one day. How many yards did he sell?
5. How many gallons in seven hundred twenty-eight quarts?
6. A dealer bought five bicycles for 225 dollars. What was the cost of one bicycle?
7. If a man saves 3 dollars a week, how many weeks will it take him to save enough money to pay for his house, on which he owes 879 dollars?
8. A farmer who has four hundred ninety-six acres of land, divides it into four farms of equal size. What is the size of each farm?
9. A carpenter receives 160 dollars for building five rods of fence. What was the cost per rod?
10. There are three hundred sixty-five days in one year. How many days in one-fifth of a year?
11. A gardener has eight hundred twenty-eight pounds of seed, which he puts into four-pound sacks. How many sacks will be required?
12. In going to school and returning home, Henry has to walk nine hundred seventy-eight yards. How far does he live from the school house?

PART SECOND.



1. The above is the plan of a lot drawn to the scale, 1 inch to 12 feet. This means that an inch in length in the drawing represents 12 feet in any line in the lot.
2. How many feet is it from A to B?
3. How many feet is it from A to F?
4. How many feet is it from F to E? From D to E? From B to C? From C to D? From A through B to C? From A through F to E?
5. How many feet of fence are required to fence the lot?
6. There are 3 feet in a yard, how many yards from A to F? From A to B? How many yards around the lot?

1. If the lot were square with sides the length of A to F, how many yards around it? If square with sides the length of A to B, how many yards around it? If square with sides the length of B to C, how many yards around it?
2. Taking steps 2 feet long, how many steps would one take in walking once around the lot described on page 101?
3. How many such steps would he take in walking halfway around the lot? In walking twice around the lot?
4. A car is 64 feet long, how long is a train of 4 such cars? Of 5 such cars?
5. A block is 453 feet long. A lamp-post is 236 feet from one end of the block; how far is it from the other end?
6. A strip of wood 6 yards long is cut into pieces 2 feet long. How many pieces are there?
7. A girl rolled a hoop 12 yards at one time and 16 yards another time. How many yards did she roll it in all? How many feet?
8. A house is 54 feet high and a flag pole on top of the house is 24 feet high. How many feet from the ground to the top of the flag pole? How many yards?
9. A field is 240 feet wide, and 325 feet long. How many feet around it?
10. A block is 486 feet long, and 273 feet wide. What is the difference between the length and the width in feet? In yards?
11. A boy lives 624 feet from the store. In going to the store and returning, how many feet will he walk? How many yards? If he goes to the store and returns once a day, 4 days in the week, how many yards will he walk?
12. A rail in the street car track is 10 yards long. How many rails in 50 yards of a single rail of track? In 2 rails of track? In all the rails of 2 tracks?



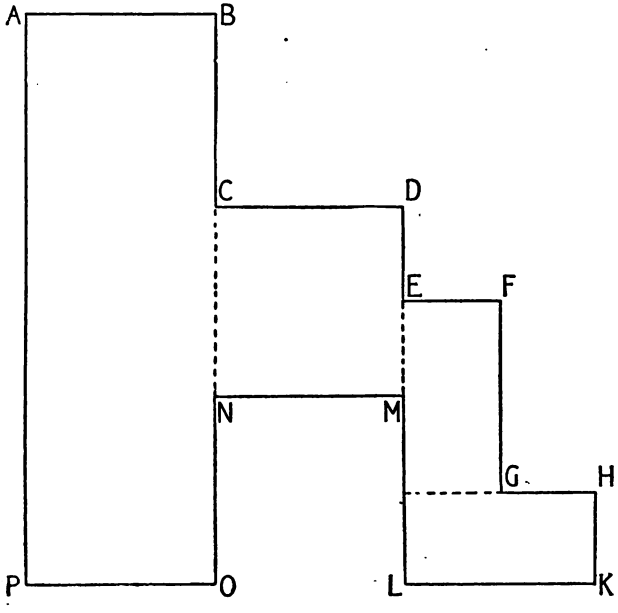
1. The above plan is for the lower story of a house.
2. How many yards long is the parlor? Sitting-room? Dining-room? Kitchen? How many yards wide is each room?
3. How many feet of molding will reach around each room? How many yards?
4. How many feet of molding will reach around all the rooms? How many yards?
5. How many strips of carpet, 1 yard wide, will cover the parlor floor? How many yards long will each strip be? How many yards in all the pieces for the parlor floor?
6. How many strips of carpet, 1 yard wide, will cover the sitting-room floor? How many yards in all the carpet for the sitting-room?
7. How many strips, 1 yard wide, will cover the dining-room floor? How many yards in all the carpet for the dining-room?
8. How many yards will be required for the 3 rooms together?

1. Joe and Harry live 20 yards apart. How many feet of telephone wire do they need to connect the 2 houses, allowing 2 yards for connection at the ends?
2. The blackboard in the schoolroom is 24 feet long. It is divided into sections 24 inches wide, how many sections are there? If there were 42 feet of blackboard, how many such sections would there be?
3. How many yards of border will be required to go around the walls of a parlor which is 15 feet by 18 feet? Around a bedroom which is 12 feet by 15 feet?
4. I wished to carpet my stairs, and found I needed for that purpose 12 yards. It takes 18 inches for each step. How many steps are there in the staircase?
5. Mr. Benton had 4 book shelves which are 3 feet long. The first shelf he filled with books 4 inches thick. How many books did he put on the shelf?

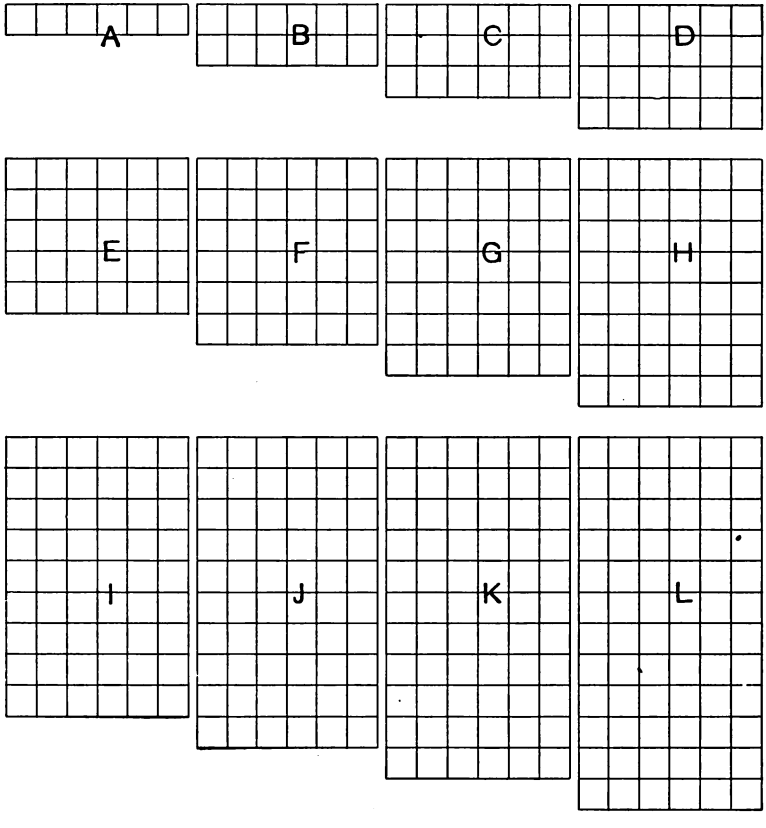
   The second shelf he filled with books 3 inches thick. How many were there?

   The third shelf he filled with books 2 inches thick. How many were there?

   The fourth shelf he filled with books 1 inch thick. How many did he put on the fourth shelf? How many books did he put on all the book-shelves?
6. Harold is 3 feet 9 inches tall and James is 4 feet tall. What is the sum of their heights?
7. George is 4 feet 9 inches tall and John is 3 feet 3 inches tall; how much taller is George than John? What is the sum of their heights?
8. James is 3 feet $11\frac{1}{2}$ inches tall and Jessie is 3 feet 7 inches tall; what is the difference in their height?
9. A room is 9 feet 8 inches high. The mantel is 4 feet 6 inches from the floor. How far is it from the mantel to the ceiling?



1. This plan of a building is drawn to the scale of one inch to twelve feet.
2. How many feet is it from A to B? From B to D through C? From D to F through E? From F to H through G? From H to M through K and L?
3. How many yards is it from P to O? From P to A? From D to E? From G to K through H? From F to L through G, H, and K?
4. How many yards is it from C to N through B, A, P and O?
5. How many yards is it from N to G through M, L, K, and H?
6. How many yards is it from G to C through F, E, and D?
7. How many yards is it around the entire building?
8. How many feet is it from B to O, following the dotted line? How many yards is it?



1. A is 6. How many 6's in B? How many in C? In D? E? F? G? H? I? J? K? L?
2. A equals 6, B equals 12. To what is C equal? D? E? F? G? H? I? J? K? L?
3. A equals what part of B? What part of C? Of D? E?
4. 6 is what part of 12? What part of 18? Of 24? 30? 36? 42? 48? 54? 60? 66? 72?
5. B equals how many A's? What part of C? Of D? E? F? G? H? I? J? K? L?

1. 12 is how many 6's? What part of 18? Of 24? 30? 36? 42? 48? 54? 60? 66? 72?
2. C equals how many A's? How many B's? What part of D? Of E? F? G? H? I? J? K? L?
3. 18 is how many 6's? How many 12's? What part of 24? 30? 36? 42? 48? 54? 60? 66? 72?
4. D equals how many A's? How many B's? How many C's? What part of E? Of F? G? H? I? J?
5. 24 is how many 6's? How many 12's? How many 18's? What part of 30? 36? 42? 48? 54? 60? 72?
6. E equals how many A's? How many B's? How many C's? How many D's? What part of F? Of G? H?
7. 30 is how many 6's? How many 12's? How many 18's? How many 24's? What part of 36? Of 42? 48?
8. F equals how many A's? B's? C's? D's? E's? Etc.

2	12	22
32	6	42
52	62	72

3	13	23
33	6	43
53	63	73

4	14	24
34	6	44
54	64	74

5	15	25
35	6	45
55	65	75

6	16	26
36	6	46
56	66	76

7	17	27
37	6	47
57	67	77

8	18	28
38	6	48
58	68	78

9	19	29
39	6	49
59	69	79

Add the red figure to each number in the same large square. Subtract it from each larger number. Multiply and divide in the same way.

NOTE.—Have pupils construct drill tables similar to those on pages 66 and 67, for this and following multiplication tables, pages 117, 125, 135, 143, 149 and 153.

1. Add upward, downward, by lines to the right and to the left:

6	6	6	3	6	6	2	3
6	2	1	6	4	2	6	6
6	6	6	1	6	1	6	6
6	6	6	6	6	6	5	6
6	6	6	6	6	6	4	1
1	3	4	5	2	6	6	5

2. Add, subtract and multiply:

12	18	24	30	36	42	48	54	60	66	72
6	6	6	6	6	6	6	6	6	6	6

13	25	37	49	51	63	75	87	99	101
6	6	6	6	6	6	6	6	6	6

3. Divide:

6)12 6)30 6)42 6)54 6)72 6)66 6)48

6)18 6)24 6)36 6)84 6)90 6)120 6)186

4. 12 equals how many 6's? 36 equals how many 6's?
24 equals how many 6's? 42 equals how many 6's?
48 equals how many 6's? 66 equals how many 6's?
18 equals how many 6's? 30 equals how many 6's?
54 equals how many 6's? 72 equals how many 6's?

5. 6 is $\frac{1}{3}$ of _____. 6 is $\frac{1}{7}$ of _____.
6 is $\frac{1}{5}$ of _____. 6 is $\frac{1}{8}$ of _____.
6 is $\frac{1}{2}$ of _____. 6 is $\frac{1}{9}$ of _____.
6 is $\frac{1}{4}$ of _____. 6 is $\frac{1}{6}$ of _____.
6 is $\frac{1}{10}$ of _____. 6 is $\frac{1}{12}$ of _____.

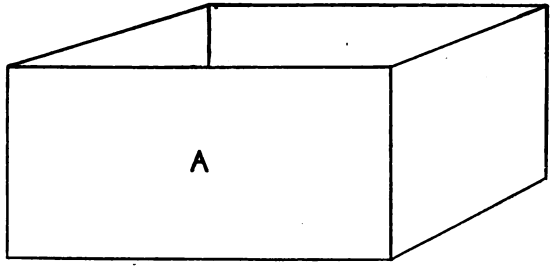
1. 3 is $\frac{1}{6}$ of _____. 7 is $\frac{1}{6}$ of _____.
   5 is $\frac{1}{6}$ of _____. 8 is $\frac{1}{6}$ of _____.
   2 is $\frac{1}{6}$ of _____. 9 is $\frac{1}{6}$ of _____.
   4 is $\frac{1}{6}$ of _____. 6 is $\frac{1}{6}$ of _____.
   10 is $\frac{1}{6}$ of _____. 12 is $\frac{1}{6}$ of _____.
2. How many 6's are there in 13? In 32?
   How many 6's are there in 57? In 51?
   How many 6's are there in 25? In 45?
   How many 6's are there in 22? In 40?
   How many 6's are there in 75? In 63?

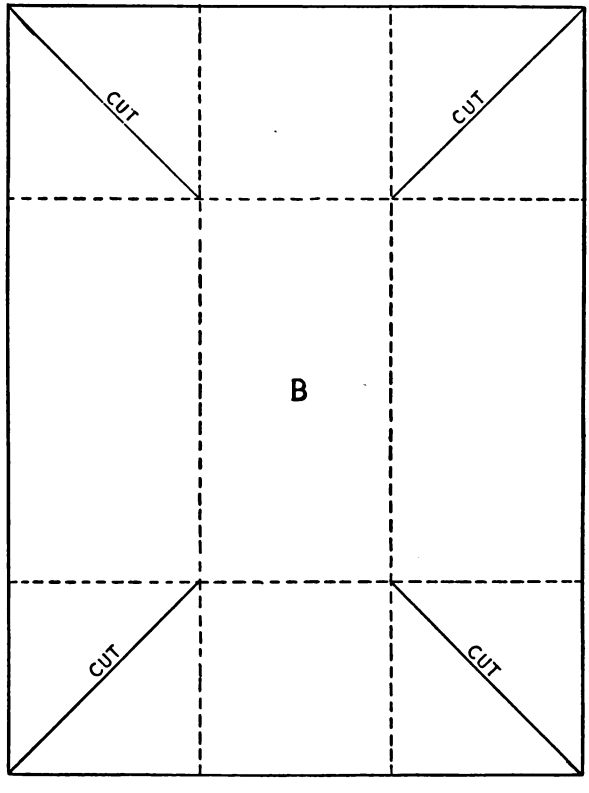
   The sign for dollars is $; 6 dollars is written $6.

   The sign for cents is ¢; 25 cents is written 25¢.
3. At $6 a cord what is the cost of 5 cords of wood? 7 cords? 9 cords? 11 cords?
4. Six windows contain 48 panes of glass. How many panes are there in each window? In one-half of one window?
5. How many minutes are there in an hour? What part of an hour are 10 minutes? 20 minutes? 30 minutes? 40 minutes?
6. One man built a fence in 60 days. How many men could have built it in 6 days? In 5 days? In 3 days?
7. One yard of braid is worth 6¢, how much are 5 yards worth?
8. At $6 a barrel, how many barrels of flour can be bought for $72? For $54? For $36? For $18? For $48? For $12?
9. In an orchard there are 54 trees in six equal rows. How many trees are there in one row?
10. Joe went to the store with 36¢ and spent all but 6¢. What part of his money did he have left? How much had he left?
11. In going to school, a boy rides 24 blocks and walks one-sixth as far as he rides. How many blocks does he walk? How far does he travel?

1. The height of a tree is 72 feet, which is 6 times the distance around it at the ground. How many feet around it at the ground?
2. If I buy 5 eight-cent postage stamps and give $1 in payment, how much change should I receive?
3. Charles traveled 87 miles on his wheel in 3 days. At the same rate how far can he go in 5 days? In 6 days?
4. In one field a farmer has 96 sheep, which are one-sixth of his entire flock. How many sheep has he?
5. If $120 were divided equally among 6 men, how much money would each one receive? How much would 2 receive together? 3 together?
6. A piece of cloth is 54 yards long. One-sixth of it was sold at $2 a yard. How much was received from the sale? How much of the piece was left? How much was it worth at the same rate?
7. If a man earns $71 a month and spends $52 a month, how much will he save in that time? How much will he save in 6 months?
8. How many hours are there in 1 day? In one-half a day? In one-sixth of a day? How many hours are there in 6 days?
9. A barrel holds $31\frac{1}{2}$ gallons; how many gallons will 6 barrels hold?
10. A farmer owned 486 acres of pasture land. He bought one-sixth as many acres more. How many acres did he buy? How many acres did he then own?
11. A mile from north to south is 8 blocks, and from east to west 13 blocks. How many blocks will a boy travel in going 6 miles north and 6 miles west?
12. What is the cost of 27 yards of sewer pipe at $2 a foot?
13. How many weeks will it take a man to save $297 if he saves $3 each week?

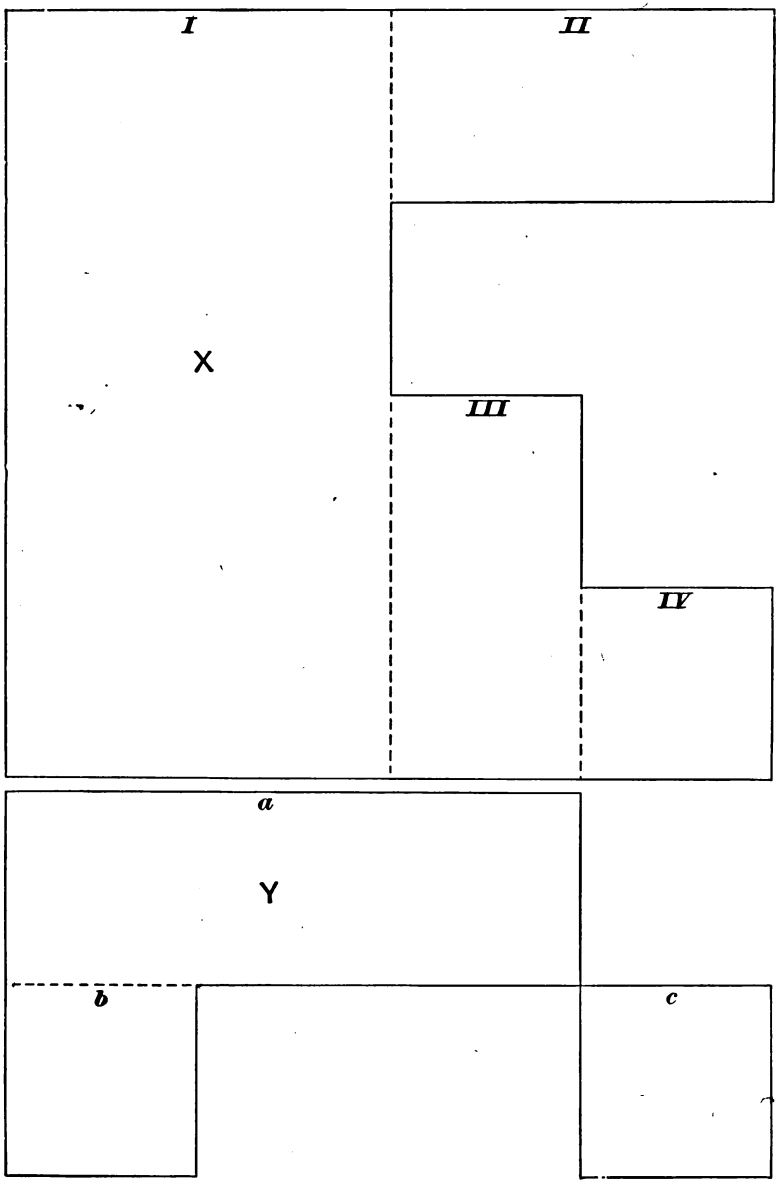
1. How many square inches in a rectangle that is 6 inches long and 3 inches wide? (See page 54.) One that is 6 inches long and 6 inches wide? One that is 6 inches long and 8 inches wide? One that is 6 inches long and 12 inches wide?
2. How many square inches in a 6 inch square? Draw one.
3. A 2 inch square equals what part of a 6 inch square?
4. A 3 inch square equals what part of a 6 inch square?
5. How many 4 inch squares in a 6 inch square?
6. How many 5 inch squares in a 6 inch square?
7. A 4 inch square equals what part of a 6 inch square?
8. A 5 inch square equals what part of a 6 inch square?
9. To what are 3 feet in length equal?
10. What then may we call a figure 3 feet square?
11. On page 50 suppose each small square in the yellow figure were one foot long. How long would the yellow figure then be? How wide? How many square feet would it contain? How many square yards? How many feet in the perimeter of a square yard?
12. On page 54 suppose each small square were one foot square. How wide would the figure be? How long? How many square feet would it contain?
13. How many square yards in a figure 2 yards square? How many feet long is one side of such a figure? How many square feet does such a figure contain?
14. How many square feet in 3 square yards? 5 square yards? 6 square yards?
15. How many square yards in 18 square feet? 36 square feet? 27 square feet? 54 square feet? 45 square feet?
16. Turn again to the yellow figure on page 50. Suppose each side is one yard long. What part of a square yard is 3 square feet? 1 square foot? 6 square feet? 2 square feet? 5 square feet? 4 square feet?



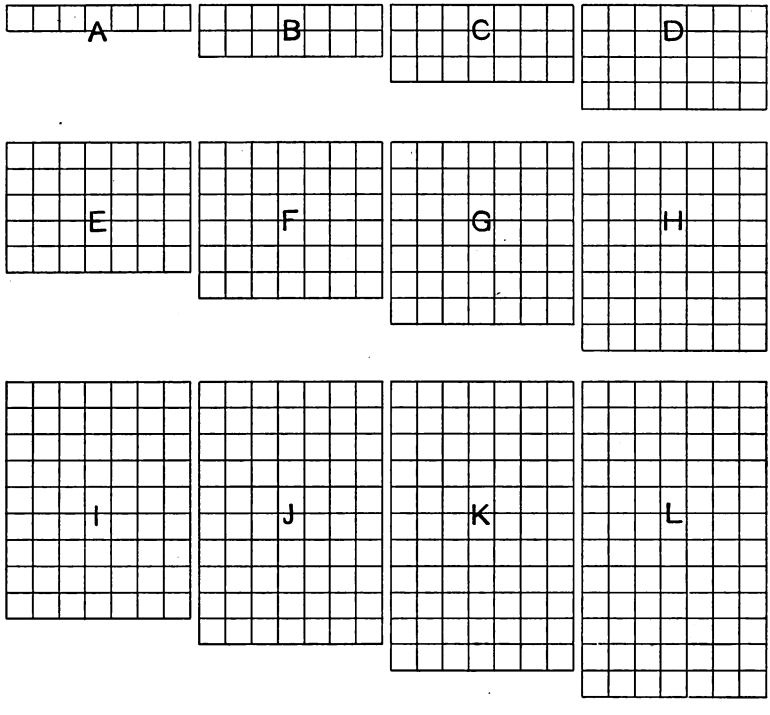


1. How long is the box A? How wide? How deep? How many square inches in one side?

1. B is a piece of paper the size from which to cut such a box without a cover.
2. How long is this paper? How wide is it?
3. The paper is then a rectangle of _____ inches by _____ inches.
4. What is the area of this paper?
5. A box is 2 inches long, 2 inches wide and 2 inches high. How many square inches in the sides and bottom of the box?
6. What are the dimensions of the piece of paper necessary to make it? What is its area?
7. What are the dimensions of the piece of paper necessary to make a box 3 inches long, 3 inches wide and 3 inches high, without a cover? What is the area of the paper?
8. What are the dimensions of a box that can be made from a piece of paper 12 inches long and 12 inches wide, without a cover?
9. A box is 4 inches long, 3 inches wide and 2 inches high. How large must the paper be in order to make it without a cover? How many square inches of paper are necessary?
10. What are the dimensions of the piece of leather necessary to line a box that is 6 inches long, 2 inches wide and 2 inches high, without a cover? How many square inches? What will the leather for such a box cost at 6 cents a square inch?
11. How many square feet of cloth are needed to line a box 6 feet long, 3 feet wide and 2 feet high, with a cover?
12. The length of a room is 6 yards, its height 4 yards. How many square yards in one side of the room? In the 2 sides? The room is 5 yards wide, what is the area of one end wall? Of both? Of the ceiling? Of the floor? Of the entire inside surface of the room?


I
II
X
III
IV
a
Y
b
c

1. The figure X is enclosed by the black irregular line. It is cut into four rectangles by the dotted lines. These rectangles are marked I, II, III, IV.
2. Measure the length and width of I. What is its area? What are the dimensions of II? Its area? Dimensions of III? Its area? Dimensions of IV? Its area?
3. Now what is the area of the figure X? Into what other rectangles might X be cut to find its area? What is the perimeter of X?
4. What part of the rectangle I equals II? III? IV? What part of II equals IV? III?
5. Suppose each inch in the dimensions of the figure X represented 3 feet. What would be the width of the rectangle I? Its length? How many square feet would it contain? How many square yards?
6. What would then be the dimensions of II? Its area? Dimensions of III? Its area? Dimensions of IV? Its area?
7. If I=8, what is II? III? IV?
   If II=6, what is IV? III? I?
8. The figure Y is made up of the rectangles *a*, *b*, *c*.
9. How long is *a*? How wide? What is its area?
10. What are the dimensions of *b*? Its area? Dimensions of *c*? Its area?
11. What is the area of the figure Y? Is there more than one way to find the area of Y?
12. Suppose each inch in the dimensions of the figure Y represented 3 feet. What would be the area of *a*? *b*? *c*? What would be the area of the entire surface of Y in square feet? In square yards?
13. What is the area of X and Y together, in square feet? In square yards?



1. A is 7. How many 7's in B? How many in C? In D? E? F? G? H? I? J? K? L?
2. A equals 7, B equals 14. To what is C equal? D? E? F? G? H? I? J? K? L?
3. A equals what part of B? What part of C? Of D? E? F? G? H? I? J? K? L?
4. 7 is what part of 14? What part of 21? Of 28? 35? 42? 49? 56? 63? 70? 77? 84?
5. B equals how many A's? What part of C? Of D? E? F? G? H? I? J? K? L?
6. 14 is how many 7's? What part of 21? Of 28? 35? 42? 49? 56? 63? 70? 77? 84?

1. C equals how many A's? How many B's? What part of D? Of E? F? G? H? I? J? K? L?
2. 21 is how many 7's? How many 14's? What part of 28? Of 35? 42? 49? 56? 63? 70? 77? 84?
3. D equals how many A's? How many B's? How many C's? What part of E? Of F? G? H? I? J? K? L?
4. 28 is how many 7's? How many 14's? How many 21's? What part of 35? Of 42? 49? 56? 63? 70? 77?
5. E equals how many A's? How many B's? How many C's? How many D's? What part of F? Of G? H? I? J? K? L?
6. 35 is how many 7's? How many 14's? How many 21's? How many 28's? What part of 42? Of 49? 56? 63? 70? 77? 84?
7. F equals how many A's? How many B's? C's? D's? E's? What part of G? Of H? I? J? K? L?
8. 42 is how many 7's? How many 14's? How many 21's? How many 28's? Etc.

2	12	22
32	**7**	42
52	62	72

3	13	23
33	**7**	43
53	63	73

4	14	24
34	**7**	44
54	64	74

5	15	25
35	**7**	45
55	65	75

6	16	26
36	**7**	46
56	66	76

7	17	27
37	**7**	47
57	67	77

8	18	28
38	**7**	48
58	68	78

9	19	29
39	**7**	49
59	69	79

Add the red figure to each number in the same large square. Subtract it from each number larger than itself. Multiply and divide in the same way.

1. Add upward, downward, by lines to the right and to the left:

7	7	6	4	5	3	2	7
7	1	2	3	4	5	6	7
7	5	6	7	3	7	5	4
7	4	7	7	7	6	7	5
7	6	6	4	7	7	7	6
7	7	7	6	6	4	3	7
1	3	3	2	2	7	4	7

2. Add, subtract and multiply:

14	28	56	21	42	84	35	70	63	78	59
7	7	7	7	7	7	7	7	7	7	7

83	75	94	67	77	89	48	99	132	576
7	7	7	7	7	7	7	7	7	7

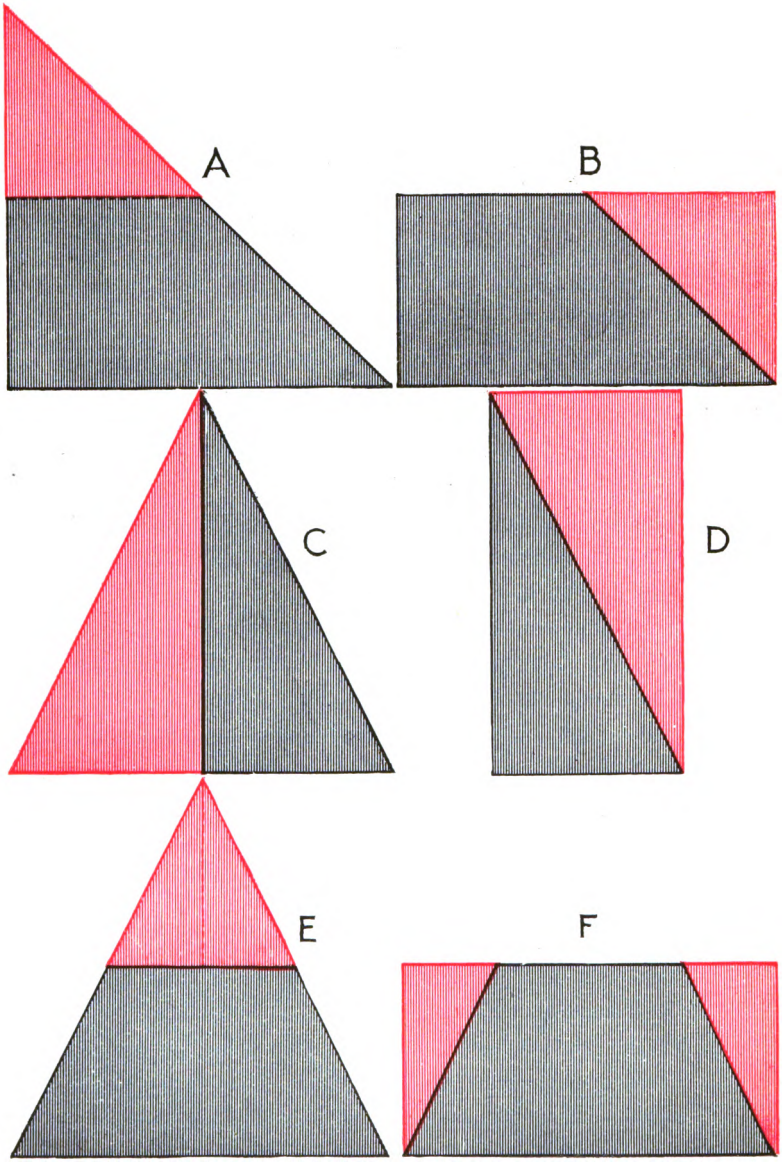
3. Divide:

7)14	7)28	7)42	7)21	7)56	7)70
7)35	7)49	7)63	7)84	7)77	6)72

4. 14 equals how many 7's? 42 equals how many 7's?
28 equals how many 7's? 49 equals how many 7's?
56 equals how many 7's? 21 equals how many 7's?
35 equals how many 7's? 77 equals how many 7's?
63 equals how many 7's? 84 equals how many 7's?

5. 7 is $\frac{1}{3}$ of _____. 7 is $\frac{1}{5}$ of _____.
7 is $\frac{1}{6}$ of _____. 7 is $\frac{1}{4}$ of _____.
7 is $\frac{1}{8}$ of _____. 7 is $\frac{1}{7}$ of _____.

1. 7 is $\frac{1}{2}$ of _____. 7 is $\frac{1}{9}$ of _____.
   7 is $\frac{1}{11}$ of _____. 7 is $\frac{1}{10}$ of _____.
   7 is $\frac{1}{12}$ of _____. 6 is $\frac{1}{9}$ of _____.
   4 is $\frac{1}{8}$ of _____. 7 is $\frac{1}{7}$ of _____.
   6 is $\frac{1}{6}$ of _____. 4 is $\frac{1}{3}$ of _____.
   8 is $\frac{1}{4}$ of _____. 9 is $\frac{1}{3}$ of _____.
   10 is $\frac{1}{5}$ of _____. 11 is $\frac{1}{6}$ of _____.
2. How many 7's are there in 15? In 29?
   How many 7's are there in 37? In 45?
   How many 7's are there in 50? In 25?
   How many 7's are there in 57? In 48?
   How many 7's are there in 86? In 78?
   How many 7's are there in 73? In 82?
3. One man digs 27 feet of ditch; another 17 feet, and a boy 7 feet. How many feet do all dig?
4. On one farm there are 754 feet of fence; on another 577 feet. How much more fence is there on the first farm than on the second?
5. A grain dealer bought 378 bushels of wheat in one place and 747 bushels in another. He sold 707 bushels; how many bushels had he left?
6. A man bought 7 horses at $65 apiece; how much did he pay for all?
7. A train travels 252 miles in 7 hours; how far does it go in 1 hour?
8. If 14 pails of butter weigh 42 pounds, what do 2 pails of the same size weigh?
9. In making a well, 63 feet deep, 14 feet were dug through clay. If $\frac{1}{9}$ of the well was dug each day, how many days were spent in digging through the clay?
10. A farmer made a wire fence 14 yards long, he put in posts 7 feet apart, and 7 rows of wire. How many posts were there? How many yards of wire did he use?


A
B
C
D
E
F

1. The lower side upon which a triangle rests is called its base. The vertical side is called its height, or altitude.
2. What is the length of the base of the triangle A on the opposite page? What is the altitude?
3. Find the middle point of the altitude and the middle point of the long side of the triangle, and between these two points suppose the triangle cut and the upper part turned about to the side of A, as in B.
4. What do we call the figure B? What is its length? What is its width? What is the area of B?
5. What then is the area of the triangle A?
6. Cut a 4-inch square. Draw a line between two opposite corners, and on this line cut the square in two. What is the altitude of one of the triangles thus formed? Its base? Find its area.
7. What are the dimensions of the triangle C? Draw a line from the center of the base to the center of the angle opposite. Suppose the left side of the triangle C to be turned about and laid upon the longest side of C as in the figure D. What is the figure D?
8. What are the dimensions of D? What is its area?
9. What then is the area of the triangle C?
10. Suppose the base of the triangle C were 6 feet and its altitude 6 feet, what would be the area of the triangle?
11. The area of such a triangle as C may be found in another way, as in the triangle E.
12. Find the middle point of the sides of the triangle, and suppose the triangle to be cut at these points and the top part equally divided and placed on the sides of the lower part of the triangle, as in the figure F. What figure do we then have? What are its dimensions? What is its area?
13. What then is the area of the triangle E?

1. Draw the following 9 triangles and find the area of each:
   The base is 6 inches and the altitude 4 inches.
   The base is 8 inches and the altitude 6 inches.
   The base is 9 inches and the altitude 4 inches.
   The base is 5 inches and the altitude 8 inches.
   The base is 12 inches and the altitude 10 inches.
   The base is 11 inches and the altitude 14 inches.
   The base is 18 inches and the altitude 12 inches.
   The base is 16 inches and the altitude 10 inches.
   The base is 15 inches and the altitude 14 inches.
2. A car contains 9 seats, each of which holds 7 persons. How many persons can be seated in the car?
3. There are 3 cars of this size in a train. How many persons can be seated in the train?
4. In front of a house there are 25 feet of sidewalk 7 feet wide. How many square feet in the sidewalk?
5. A door is 7 feet high and 3 feet wide. How many square feet in the door? How many square feet if the door were $3\frac{1}{2}$ feet wide?
6. How many books would there be in a bookcase containing 7 shelves, if there were 12 books on each shelf? 11 on each shelf? 9 on each shelf? 10 on each shelf? 20 on each shelf? 30 on each shelf?
7. A table is 7 feet long and 4 feet wide. What is its perimeter? What is its area?
8. There are 35 pupils enrolled in one schoolroom. If 5 are away, how many are present? What part of the whole number is absent? What part of the whole number is present?
9. A fruit dealer sells pineapples at 34 cents apiece. How much money will he receive for 7 pineapples?
10. If I save 57 dollars a month for 7 months, how much more must I save to have $700?

1. A piece of pipe is 30 feet long. How long are 7 such pieces together?
2. In a cellar there are 2 bins, each holding 14 bushels. How many sacks of apples, each holding 7 bushels, will be required to fill the bins?
3. The distance around a field is 63 rods. $\frac{1}{7}$ of the fencing around it is hedge, the remainder is board fence. How many rods of hedge? How many rods of board fence?
4. In a farm of 140 acres there are 7 acres of orchard. What part of the farm is the orchard? How much land beside the orchard?
5. A grocer selling rice in 7 pound packages, sold 3 packages to one man and 4 to another. How many pounds did he sell to both?

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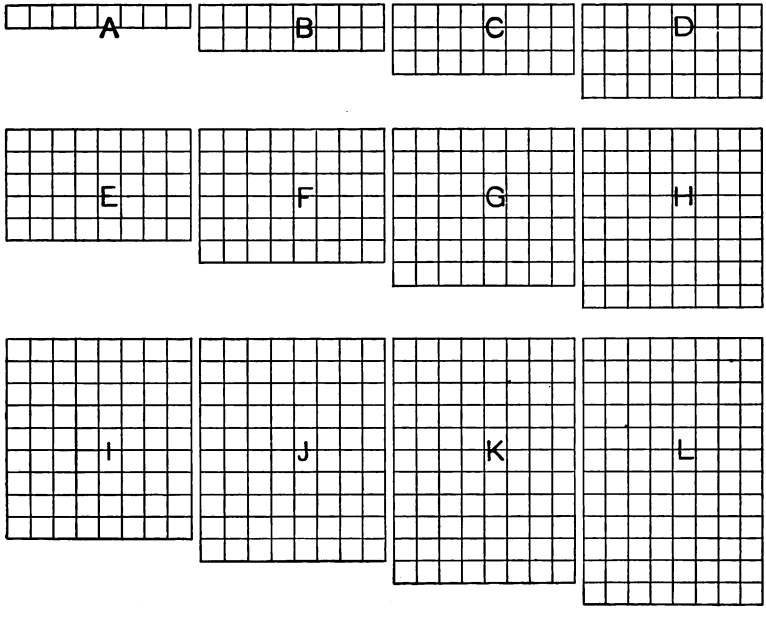
6. A florist sells roses which cost him 57 cents per dozen, for 95 cents per dozen. How much does he gain on 7 dozen?
7. $8253 were divided equally among 7 children. How many dollars did each child receive?
8. Mr. Wood had $2891 and spent one-seventh of it. How many dollars had he left? What part of his money had he left?
9. A lot cost $3747, a house $2735, a barn $878 and a sidewalk $177. What was the cost of all?
10. An army of 9287 men engaged in battle. 1375 were killed and 57 were made prisoners. How many were left in the army?
11. I bought 176 cameras for $7 each. I sold the whole number for $1100. Did I gain or lose, and how much?
12. Mr. Adams owned 19 horses; he kept 12 and sold the remainder for $896. How much did he receive for each horse sold?



1. A is 8. How many 8's in B? How many in C? In D? E? F? G? H? I? J? K? L?
2. A equals 8, B equals 16. To what is C equal? D? E? F? G? H? I? J? K? L?
3. A equals what part of B? What part of C? Of D? E? F? G? H? I? J? K? L?
4. 8 is what part of 16? What part of 24? Of 32? 40? 48? 56? 64? 72? 80? 88? 96?
5. B equals how many A's? What part of C? Of D? E? F? G? H? I? J? K? L?
6. 16 is how many 8's? What part of 24? Of 32? 40? 48? 56? 64? 72? 80? 88? 96?
7. C equals how many A's? How many B's? What part of D? Of E? F? G? H? I? J? K? L?

1. 24 is how many 8's? How many 16's? What part of 32? Of 40? 48? 56? 64? 72? 80? 88? 96?
2. D equals how many A's? How many B's? How many C's? What part of E? Of F? G? H? I? J? K? L?
3. 32 is how many 8's How many 16's? How many 24's? What part of 40? Of 48? 56? 64? 72? 80? 88? 96?
4. E equals how many A's? How many B's? How many C's? How many D's? What part of F? Of G? H? I? J? K? L?
5. 40 is how many 8's? How many 16's? How many 24's? How many 32's? What part of 48? Of 56? 72? 80? 88? 96?
6. F equals how many A's? B's? C's? D's? E's? What part of G? Of H? I? J? K? L?
7. 48 is how many 8's? How many 16's? How many 24's? How many 32's? Etc.

2	12	22
32	8	42
52	62	72

3	13	23
33	8	43
53	63	73

4	14	24
34	8	44
54	64	74

5	15	25
35	8	45
55	65	75

6	16	26
36	8	46
56	66	76

7	17	27
37	8	47
57	67	77

8	18	28
38	8	48
58	68	78

9	19	29
39	8	49
59	69	79

Add the red figure to each number in the same large square. Subtract it from each number larger than itself. Multiply and divide in the same way.

1. Add upward, downward, by lines to the right and to the left:

8	8	8	8	8	8	8	8
8	7	8	6	5	8	1	7
8	6	7	4	8	6	2	7
8	5	8	2	8	5	3	6
8	4	3	7	6	7	4	6
8	3	4	5	8	3	5	4
8	2	8	8	7	8	6	4
7	1	6	8	6	8	7	3

2. Add, subtract and multiply:

32	24	16	48	56	72	64	88	80	40
8	8	8	8	8	8	8	8	8	8

13	25	37	49	79	88	67	98	386	497
8	8	8	8	8	8	8	8	8	8

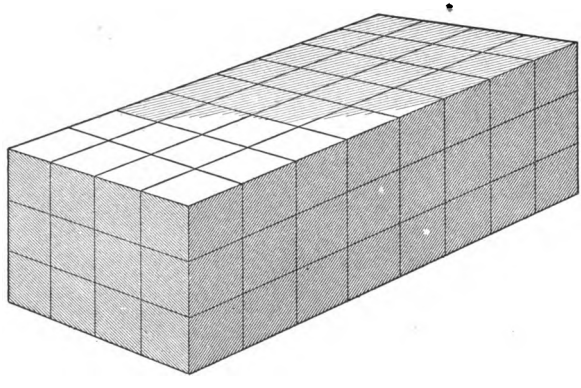
3. Divide:

8)16	8)32	8)48	8)24	8)56	8)72
8)40	8)64	8)88	8)96	8)80	7)84

4. 16 equals how many 8's?
32 equals how many 8's?
40 equals how many 8's?
56 equals how many 8's?
88 equals how many 8's?
80 equals how many 8's?
48 equals how many 8's?
64 equals how many 8's?
24 equals how many 8's?
72 equals how many 8's?
96 equals how many 8's?
49 equals how many 7's?

5. 8 is $\frac{1}{3}$ of _____. 8 is $\frac{1}{5}$ of _____.

1. 8 is $\frac{1}{2}$ of _____. 8 is $\frac{1}{6}$ of _____.
   8 is $\frac{1}{4}$ of _____. 8 is $\frac{1}{8}$ of _____.
   8 is $\frac{1}{9}$ of _____. 8 is $\frac{1}{7}$ of _____.
   8 is $\frac{1}{10}$ of _____. 8 is $\frac{1}{12}$ of _____.
   8 is $\frac{1}{11}$ of _____. 7 is $\frac{1}{2}$ of _____.
   6 is $\frac{1}{7}$ of _____. 4 is $\frac{1}{9}$ of _____.
   5 is $\frac{1}{11}$ of _____. 3 is $\frac{1}{8}$ of _____.
2. How many 8's are there in 17? In 34?
   How many 8's are there in 47? In 27?
   How many 8's are there in 56? In 63?
   How many 8's are there in 71? In 81?
   How many 8's are there in 20? In 42?
   How many 8's are there in 59? In 67?
   How many 8's are there in 76? In 30?
   How many 8's are there in 85? In 98?
3. A boy picked 38 quarts of berries in one week, 42 in the second, 28 in the third, and 18 in the fourth. How many quarts did he pick?
4. In one school there are 858 scholars; in another there are 684. How many more are there in one than in the other?
5. A man traveled 284 miles by rail and 8 times as far by boat; how far did he travel by boat?
6. During the summer a family used 248 quarts of milk. During the winter they used $\frac{5}{8}$ as much. How many quarts did they use during the winter?
7. If one boat holds 5 persons; how many boats will be needed for a party of 40 people?
8. In an orchard there are 56 trees in each row, and $\frac{1}{7}$ as many rows as there are trees in each one; how many rows are there? How many trees in all?
9. If 32 bushels of wheat make 8 barrels of flour; how many bushels will be needed to make 64 barrels?



1. In the first layer of blocks in this solid, how many rows of 4 blocks each? How many blocks in the layer? How did you find this? In all 3 layers, or the entire solid, how many blocks are there? How did you find this? How then do you find the number of cubic feet in any solid?
2. How many inch cubes are there in a block 2 inches long, 2 inches wide and 1 inch high? See page 68. How many inch cubes are there in a block 4 inches long, 2 inches wide and 1 inch high?
3. How many inch cubes are there in a block 6 inches long, 4 inches wide and 1 inch high? How many inch cubes are there in one row? How many of these rows are there in the block?
4. How many cubic inches are there in a box that is 4 inches long, 3 inches wide and 1 inch high? 2 inches high? 3 inches high?
5. How many cubic inches are there in a box 4 inches long, 2 inches wide and 2 inches high?
6. A block containing 12 cubic inches is 3 inches long and 2 inches wide; how high is it?

1. A pencil box containing 24 cubic inches is 3 inches wide and 1 inch high; how long is it?
2. A block is 3 feet long, 3 feet wide and 3 feet high; how many cubic feet does it contain? What is the area of one side of such a block in square feet? In square yards? How many cubic yards in a block 1 yard long, 1 yard wide and 1 yard high? How many cubic feet in such a block?
3. A room is 5 yards wide, 7 yards long and 4 yards high. How many cubic yards are there in the room?
4. A cellar is 7 yards long, 6 yards wide and 3 yards deep. How many cubic yards of earth were taken out in digging the cellar?
5. The foundation of a house is equal to a straight wall 65 feet long, 4 feet high and $1\frac{1}{2}$ feet wide. How many cubic feet does it contain?
6. A box is 7 feet long, 3 feet wide and contains 63 cubic feet. How long is it?
7. A bin is 3 feet wide, 4 feet high and contains 72 cubic feet. How long is it?
8. A coal-bin is 12 feet long, 6 feet wide and 7 feet high. How many cubic feet of coal will it hold?
9. A car is 7 yards long, 4 yards wide and $3\frac{1}{2}$ yards high. How many cubic yards does it contain?
10. A man has 4 bins, each 5 feet long, 4 feet wide and 3 feet high. How many cubic feet of coal will they hold together?
11. A bin is 12 feet long, 9 feet wide and 6 feet high. How many cubic yards does it contain?
12. 1 box is 4 feet long, 3 feet wide and 2 feet high. A second is 5 feet long, 3 feet wide and 2 feet high. A third is 6 feet long, 5 feet wide and 4 feet high. How many cubic feet in the 3 boxes?

1. Review page 74.
2. In a 5-gallon can, how many quarts are there? How many pints? How many gills?
3. A milk-man started in the morning with 100 quarts of milk. How many pints did he have? How many gallons?
4. There are 8 people in a family and each one drinks $\frac{1}{2}$ a pint of milk. How many pints must be bought? How many quarts?
5. From a jar containing 2 gallons of mineral water, 6 pints were taken. How many pints were left? How many quarts?
6. How many bottles holding 2 quarts each can be filled from 20 gallons?
7. A lamp burns a quart of oil every 24 hours. How many pints must be bought to last 32 days? How many gallons?

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8. A milk-man had 176 quarts of milk. How many gallons did he have?
9. How many gill cups can be filled from 2 quarts and 1 pint of vinegar? From 5 gallons?
10. There are $31\frac{1}{2}$ gallons in a barrel. How many gallons are there in 4 barrels? In 6 barrels? In 8 barrels? 3 barrels? 5 barrels?
11. A barrel holds $31\frac{1}{2}$ gallons? How many quarts in it?
12. From a barrel of gasoline how many cans may be filled if each holds 3 quarts? How many if each holds $\frac{1}{2}$ a gallon? $1\frac{1}{2}$ gallon?
13. A milk-man starts in the morning with 48 gallons of milk. How many customers can he serve if each takes 3 quarts? How many, if each takes 2 quarts? If each takes 3 pints?

1. Review page 76.
2. At 9¢ a peck, what will 2 bushels of oats cost?
3. What is 1 quart of beans worth if a peck is worth 72¢?
4. At $2 a peck, how many bushels of clover seed can be bought for $88?
5. A fruit dealer sold 3 pecks of nuts at 8¢ a quart. What did he receive for them?
6. A farmer picked 2 bushels of apples from one tree and 3 bushels from another. How many pecks did he pick from both together?
7. A grain bin holds 2 bushels. How many pecks do 7 such bins hold?
8. During the summer a boy picked 64 quarts of berries. How many pecks did he pick? How many bushels?

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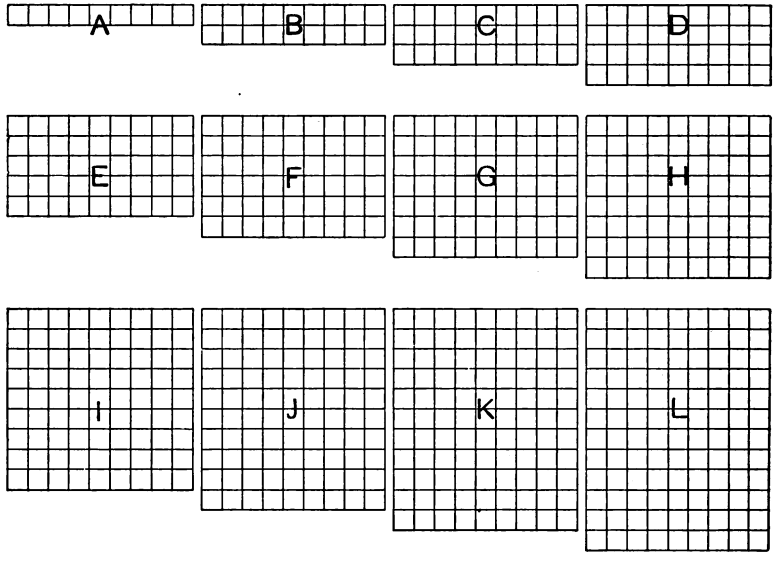
9. From a bushel of beans 2 quarts and 1 pint are taken. How many quarts are left?
10. How many pint boxes of cherries may be filled from a peck?
11. A man paid 60¢ for $1\frac{1}{2}$ bushels of apples. He sold them at 15¢ a peck. How much did he receive? How much did he gain?
12. 2 boys gathered 6 bushels of nuts. They sold $5\frac{1}{2}$ bushels by the peck. How many pecks did they sell? The remainder they sold by the quart. How many quarts did they sell?
13. A wheat bin holds 144 bushels. If 340 pecks are taken out, how many pecks remain? How many bushels?
14. A farmer's apple orchard yields an average of 5 bushels per tree. If there are 75 trees in the orchard, what is the entire yield? If he packs them in barrels, allowing 3 bushels to a barrel, how many barrels would he require?

1. How long will it take to travel 592 miles on a bicycle at the rate of 8 miles an hour?
2. A squirrel carried into his hole 8 acorns every day. How many did he carry in 8 weeks?
3. Find the cost of 2 bushels, 3 pints of cherries at 4¢ a pint.
4. What is the weight of 8 tubs of butter, each weighing $56\frac{1}{2}$ pounds?
5. What is the cost of 12 pecks, 3 quarts of peas at 8¢ a quart?
6. What is the cost of 8 sacks of barley, each weighing 112 pounds, at 8¢ a pound?
7. How many pints in 536 gallons? In 987 gallons?
8. How many quarts in 498 pecks? In 789 pecks? In 586 pecks? In 379 pecks?
9. How many months will it take a man to save $1,000 if he saves $8 a month?
10. How many pecks in 2768 quarts? In 7912 quarts? In 6856 quarts?
11. How many gallons in 4584 pints? In 9728 pints? In 8136 pints?
12. How long will a barrel of oil containing 504 pints last, if 8 pints are burned each week?
13. Find the weight of 8 barrels of oat meal, each containing 192 pounds.
14. A fruit-dealer bought 8 barrels of apples at $2 a barrel, each barrel containing 3 bushels. He sold them at $1 a bushel. How much did he get for them? How much did he gain?
15. Allowing 30 days to a month, how many days are there in 8 months?
16. A farmer had 420 bushels of wheat. He sold $\frac{1}{3}$ of it to one man and 304 pecks to another. How many bushels had he left?

1. There are 9 horses in each of 8 fields; how many horses are there in all?
2. If a person works 8 hours a day, how many hours will he work from Monday morning until Saturday night?
3. A boy was asked how many marbles he had, and replied that if he had 8 times as many he would have 56. How many had he?
4. A ship sails 8 miles an hour. At the same rate, in how many hours will it sail 88 miles?
5. At $12 a month, how much is the rent of a house for 8 months?
6. A clerk receiving $12 a week, spends $4 for board. If he saves the rest, how much will he have in 8 weeks?
7. A man being asked the value of his horse, said he would take $96 dollars for him although he was worth one-eighth more. What was the horse worth?
8. Mabel is 20 years old, and her sister's age is three-fourths of hers. How old is her sister?
9. At 8¢ a quart, what will 6 quarts of cranberries cost?
10. A horse goes 9 miles in 2 hours; a train runs 8 times as fast. How many miles will the train run in the same time?
11. How much is hay per ton when $88 is paid for 8 tons?
12. A horse is fed a peck of oats a day. How many weeks will 42 pecks last him?
13. If a family uses 2 quarts of milk a day, at 4¢ a quart how much will the bill amount to in 8 days?
14. How many days are there in 32 weeks?
15. If 1 jumping-rope is 6 feet long, how long are 8 such ropes together? How many yards long?
16. If 1 pint of oil costs 3¢, what will 4 quarts cost?
17. A family uses 6 pints of mineral water a day. How many gallons will they use in 32 days?



1. A is 9. How many 9's in B? How many in C? In D? E? F? G? H? I? J? K? L?
2. A equals 9. B equals 18. To what is C equal? D? E? F? G? H? I? J? K? L?
3. A equals what part of B? What part of C? Of D? E? F? G? H? I? J? K? L?
4. 9 is what part of 18? What part of 27? Of 36? 45? 54? 63? 72? 81? 90? 99? 108?
5. B equals how many A's? What part of C? Of D? E? F? G? H? I? J? K? L?
6. 18 is how many 9's? What part of 27? Of 36? 45? 54? 63? 72? 81? 90? 99? 108?
7. C equals how many A's? How many B's? What part of D? Of E? F? G? H? I? J? K? L?
8. 27 is how many 9's? How many 18's? What part of 36? Of 45? 54? 63? 72? 81? 90? 99? 108?

1. D equals how many A's? How many B's? How many C's? What part of E? Of F? G? H? I? J? K? L?
2. 36 is how many 9's? How many 18's? How many 27's? What part of 45? Of 54? 63? 72? 81? 90? 99? 108?
3. E equals how many A's? How many B's? How many C's? How many D's? What part of F? Of G? H? I? J? K? L?
4. 45 is how many 9's? How many 18's? How many 27's? How many 36's? What part of 54? Of 63? 72? 81? 90? 99? 108?
5. F equals how many A's? How many B's? How many C's? How many D's? How many E's? What part of G? Of H? I? J? K? L?
6. 54 is how many 9's? How many 18's? How many 27's? How many 36's? Etc.

2	12	22
32	**9**	42
52	62	72

3	13	23
33	**9**	43
53	63	73

4	14	24
34	**9**	44
54	64	74

5	15	25
35	**9**	45
55	65	75

6	16	26
36	**9**	46
56	66	76

7	17	27
37	**9**	47
57	67	77

8	18	28
38	**9**	48
58	68	78

9	19	29
39	**9**	49
59	69	79

Add the red figure to each number in the same large square. Subtract it from each number larger than itself. Multiply and divide in the same way.

1. Add upward, downward, by lines to the right and to the left:

9	9	9	9	9	9	9	9	9
8	9	7	6	9	4	3	2	3
7	8	9	6	5	9	9	8	4
6	9	7	9	9	4	3	9	6
5	8	9	6	9	9	9	2	5
4	9	7	9	5	9	3	9	8
3	8	9	6	9	4	9	2	7
2	9	7	9	5	9	3	9	9
1	8	9	6	9	4	9	2	8

2. Add, subtract and multiply:

47	68	45	89	93	77	90	64	99
9	9	9	9	9	9	9	9	9

39	88	92	46	80	209	398	768	908
9	9	9	9	9	9	9	9	9

3. Divide:

9)27	9)45	9)63	9)36	9)54	9)18
9)72	9)108	9)90	9)81	9)99	8)96

4. 27 equals how many 9's?
54 equals how many 9's?
63 equals how many 9's?
18 equals how many 9's?
72 equals how many 9's?
99 equals how many 9's?
45 equals how many 9's?
36 equals how many 9's?
81 equals how many 9's?
90 equals how many 9's?
108 equals how many 9's?
72 equals how many 8's?

1. 9 is $\frac{1}{4}$ of _____. 9 is $\frac{1}{6}$ of _____.
   9 is $\frac{1}{2}$ of _____. 9 is $\frac{1}{8}$ of _____.
   9 is $\frac{1}{8}$ of _____. 9 is $\frac{1}{3}$ of _____
   9 is $\frac{1}{9}$ of _____. 9 is $\frac{1}{7}$ of _____.
   9 is $\frac{1}{10}$ of _____. 9 is $\frac{1}{12}$ of _____.
   9 is $\frac{1}{11}$ of _____. 8 is $\frac{1}{7}$ of _____.

2. How many 9's in 19? In 29?
   How many 9's in 48? In 56?
   How many 9's in 39? In 65?
   How many 9's in 76? In 109?
   How many 9's in 84? In 98?

3. At sight, name the sums:

5	6	7	8	9	4	8	7	7	5
4	7	8	9	3	9	6	7	9	9

5	6	9	8	7	6	5	7	4	3
3	7	5	6	8	9	4	6	9	9
2	3	4	4	6	5	6	9	8	7

10	41	22	53	84	75	36	67	98	59
6	6	6	6	6	6	6	6	6	6

4. At sight, name the differences:

12	15	18	17	19	16	29	25	28	29
4	6	4	6	5	4	9	3	7	10

24	26	28	26	27	25	23	28	27	29
13	12	15	14	16	14	11	15	13	16

21	22	23	24	25	27	28	26	25	24
9	6	7	8	6	9	8	9	7	6

1. What is the cost of 4 dozen eggs at 9¢ a dozen?
2. What is the cost of 6 feet of molding, if 9 feet cost 81¢?
3. How long will it take 1 man to do the work that 9 men can do in 11 days?
4. William earns one-ninth as much money as his father whose wages are $63 a month; how much does William earn a month?
5. In the front of a building there are 72 windows. In each story there are 9 windows; how many stories high is the building?
6. Jane's grandfather is 72 years of age, and Jane is one-ninth as old; in how many years will she be 17?
7. How much more than $36 should a man have in order to buy 9 tons of coal at $5 a ton?
8. There are 8 rows of seats in a school-room, and 9 seats in each row; how many seats in the room?

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9. Find the cost of 17 barrels of rice at $9 a barrel.
10. I had 9 dozen buttons and used 88 buttons. How many were left? How much did I pay for all of them at 6¢ a dozen?
11. A steamer sails 298 miles a day. How far will it sail in 9 days?
12. I bought 12 barrels of flour at $9 a barrel, and sold the flour for $95. How much did I lose?
13. At $158 an acre, what will 9 acres of land cost?
14. Alice has $11 and her father has 9 times as much and $8 more. How many dollars have both?
15. A certain line of telegraph costs $985 a mile. How much would 9 miles cost?
16. What is a man's income in 9 years at $2385 a year?
17. A gentleman earns $9 a day for 8 days, and spends $8 a day for 8 days. How much has he left?

1. How many square feet in a square yard?
2. A blackboard is 4 feet wide and 9 feet long. How many square feet in it? How many square yards?
3. Each window in a school-room contains 9 square feet. In 6 such windows there are how many square feet? How many square yards?
4. There are 9 shelves in a book-case; each one contains 12 books. How many books in the case?
5. One end of a desk is 9 feet from the wall, the other end is 7 feet from the opposite wall. The desk is 3 feet and 6 inches long. How far is it from one side of the room to the other?
6. A horse travels 6 miles an hour. How far will it go at the same rate, in 9 hours?
7. John has 83¢. How many 9¢ books can he buy, and how much money will he have left?
8. A boy pays 12¢ for 3 pencils. At the same rate what will 9 pencils cost?

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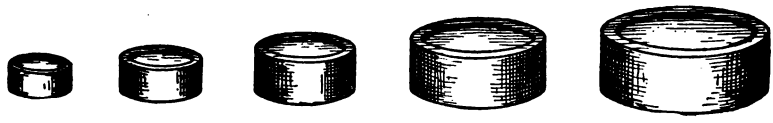
9. In each of 9 cars there are 57 persons. How many persons in the 9 cars?
10. There are 322 rails to the mile of railroad track. How many rails in 9 miles of track?
11. There are 9 equal lots fronting on a street 378 feet long. How wide is each lot?
12. A man owns 5 lots. The first is worth $1,929, the second $959, the third $1,195, the fourth $1,699, and the fifth $989. What is the value of the 5 lots?
13. A boy takes 9 subscriptions to the Youth's Companion at $1.75 each. How much money did he receive for them all?
14. A manufacturer sold 9 carriages at $195 each. How much did he get for them?

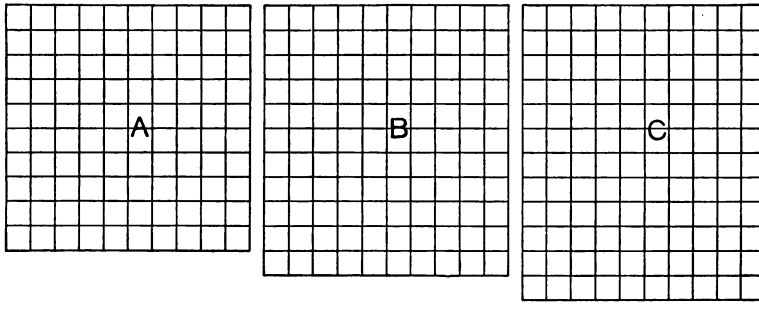


1 ounce 2 ounces 4 ounces 8 ounces 16 ounces
1 pound

1. Review page 78.
2. How many ounces are there in 1 pound? In 2 pounds? 3 pounds? 4 pounds? 6 pounds?
3. What part of 1 pound is 8 ounces? 4 ounces? 2 ounces? 12 ounces?
4. Which weight shown on this page equals $\frac{1}{2}$ a pound? Which one equals $\frac{1}{16}$ of a pound? Which $\frac{1}{4}$? Which $\frac{1}{8}$?
5. Which 2 weights together equal $\frac{3}{4}$ of a pound? Which 2 together $\frac{5}{8}$ of a pound?
6. The 8 ounce weight equals what part of 2 pounds? Of 3 pounds?
7. The 4 ounce weight equals what part of 2 pounds? Of 3 pounds?
8. The 8 ounce and the 4 ounce weight together equal what part of 2 pounds? Of 3 pounds?
9. 100 pounds are called a hundredweight.
10. How many hundredweights are there in 200 pounds? In 400 pounds?
11. How many pounds are there in $\frac{1}{2}$ of a hundredweight? $\frac{1}{4}$ of a hundredweight? $\frac{3}{4}$?
12. If a grocer has different weights, as shown in the picture, which ones will he use in weighing $\frac{3}{4}$ of a pound of tea? Which in weighing $\frac{3}{8}$ of a pound? $\frac{9}{16}$ of a pound? $\frac{3}{16}$? $\frac{1}{2}$? $\frac{5}{16}$? $\frac{1}{8}$? $\frac{1}{4}$? $\frac{1}{16}$? $\frac{11}{16}$? $\frac{5}{8}$? $\frac{15}{16}$? $\frac{7}{8}$? $\frac{13}{16}$?
13. Which different weights may he use in weighing $1\frac{1}{4}$ pounds of rice? In weighing $1\frac{7}{8}$ pounds? $1\frac{1}{8}$ pounds? $1\frac{1}{2}$ pounds? $1\frac{3}{4}$?

1. There are 60 pounds of wheat in 1 bushel. How many pounds in 9 bushels? In 7 bushels? In 5 bushels?
2. 1 hundredweight of metal costs $6. What will 50 pounds cost? 75 pounds? 25 pounds?
3. What is the postage at $\frac{1}{2}¢$ an ounce on a package weighing 4 ounces? On $1\frac{1}{2}$ pounds? On 3 pounds?
4. A bushel of oats weighs 32 pounds, how many pounds in a peck? In a quart? In 3 pecks?
5. A grocer weighs out $1\frac{1}{2}$ pounds of butter. What weights does he use? How many 4 ounce weights will he use to weigh $1\frac{1}{4}$ pounds? $\frac{3}{4}$ pound? 2 pounds?
6. Find the value of 4 pounds and 8 ounces of pepper at 20¢ a pound.
7. A grocer sells 8 packages of tea, each weighing 6 ounces; how many ounces do all weigh together? How many pounds?
8. A man bought 60 bags of flour, each weighing 5 pounds. How many hundredweights did he buy?
9. If a man buys old iron at $1\frac{1}{2}¢$ a pound, what will he pay for 24 pounds? For $\frac{1}{2}$ a hundredweight?
10. How many ounces are there in 12 pounds?
11. A farmer sold 6 tubs of butter averaging in weight $\frac{1}{2}$ a hundredweight each? How many pounds did he sell? How many ounces?
12. What is the weight in pounds of 3 packages, one weighing $2\frac{1}{2}$ pounds, one $\frac{1}{2}$ a pound and the other 3 pounds? What is the weight in ounces?
13. A man bought 3 packages of beans weighing 8 pounds each; he made them into 8-ounce packages. How many packages did he have?
14. A grocer sold $\frac{1}{8}$ of a pound of tea, $\frac{1}{2}$ a pound of butter, $\frac{3}{4}$ of a pound of coffee, and $1\frac{1}{2}$ pounds of sugar. How many ounces in the entire sale?

1. $1 \times 10 = 10 \times 1 =$ _____.
   $2 \times 10 = 10 \times 2 =$ _____.
   $3 \times 10 = 10 \times 3 =$ _____.
   $4 \times 10 = 10 \times 4 =$ _____.
   $5 \times 10 = 10 \times 5 =$ _____.
   $6 \times 10 = 10 \times 6 =$ _____.
   $7 \times 10 = 10 \times 7 =$ _____.
   $8 \times 10 = 10 \times 8 =$ _____.
   $9 \times 10 = 10 \times 9 =$ _____.



2. How many 10's in A? In B? In C?
3. A equals what part of B? Of C?
4. B equals how many A's? What part of C?
5. C equals how many A's? How many B's?
6. 10 is what part of 20? Of 30? 40? 50? 60? 70? 80? 90? 100? 110? 120?
7. 20 is how many 10's? What part of 30? Of 40? 50? 60? 70? 80? 90? 100? 110? 120?
8. 30 is how many 20's? What part of 40? Of 50? 60? 70? 80? 90? 100? 110? 120?
9. 40 is how many 20's? How many 30's? What part of 50? Of 60? 70? 80? 90? 100? 110? 120?
10. 50 is how many 20's? How many 30's? How many 40's? What part of 60? Of 70? 80? 90? 100? 110? 120?

1. 60 is how many 20's? How many 30's? 40's? 50's? What part of 70? Of 80? 90? 100? 110? 120?
2. 70 is how many 20's? How many 30's? 40's? 50's? 60's? What part of 80? Of 90? 100? 110? 120?
3. 80 is how many 20's? How many 30's? 40's? 50's? 60's? 70's? What part of 90? Of 100? 110 120?
4. 90 is how many 20's? How many 30's? 40's? 50's? 60's? 70's? 80's? What part of 100? 110? 120?
5. 100 is how many 20's? How many 30's? 40's? 50's? 60's? 70's? 80's? 90's? What part of 110? Of 120?
6. 110 is how many 20's? How many 30's? 40's? 50's? 60's? 70's? 80's? 90's? 100's? What part of 120?
7. 120 is how man 20's? How many 30's? 40's? 50's? 60's? 70's? 80's? 90's? 100's? 110's?
8. Add, subtract and multiply:

12	15	23	30	36	42	47	53	59	61	68
10	10	10	10	10	10	10	10	10	10	10

74	79	80	83	88	91	98	87	59	67	99
10	10	10	10	10	10	10	10	10	10	10

8. Divide:

10)30 10)50 10)46 10)60 10)75 10)29 10)80

10)67 10)90 10)38 10)100 10)99 10)110 10)120

10. 30 equals how many 10's? 50 equals how many 10's?
40 equals how many 10's? 70 equals how many 10's?
60 equals how many 10's? 20 equals how many 10's?
90 equals how many 10's? 110 equals how many 10's?
80 equals how many 10's? 100 equals how many 10's?
120 equals how many 10's? 81 equals how many 9's?

1. 10 is $\frac{1}{3}$ of _____. 10 is $\frac{1}{2}$ of _____.
   10 is $\frac{1}{5}$ of _____. 10 is $\frac{1}{4}$ of _____.
   10 is $\frac{1}{7}$ of _____. 10 is $\frac{1}{9}$ of _____.
   10 is $\frac{1}{6}$ of _____. 10 is $\frac{1}{8}$ of _____.
   10 is $\frac{1}{11}$ of _____. 10 is $\frac{1}{10}$ of _____.
   10 is $\frac{1}{12}$ of _____. 9 is $\frac{1}{6}$ of _____.
   7 is $\frac{1}{7}$ of _____. 8 is $\frac{1}{9}$ of _____.
   6 is $\frac{1}{10}$ of _____. 5 is $\frac{1}{11}$ of _____.
   4 is $\frac{1}{9}$ of _____. 7 is $\frac{1}{9}$ of _____.
   3 is $\frac{1}{12}$ of _____. 9 is $\frac{1}{11}$ of _____.
2. How many 10's are there in 34? In 56?
   How many 10's are there in 29? In 47?
   How many 10's are there in 66? In 70?
   How many 10's are there in 85? In 100?
   How many 10's are there in 99? In 125?
3. What is the sum of three 10's and five 10's?
   What is the sum of four 10's and five 10's?
   What is the sum of six 10's and five 10's?
   What is the sum of five 10's and five 10's?
   What is the sum of six 10's and six 10's?
4. What is the sum of 40 and five 10's?
   What is the sum of 70 and three 10's?
   What is the sum of 85 and two 10's?
   What is the sum of 33 and six 10's?
   What is the sum of 110 and nine 10's?
   What is the sum of 130 and four 10's?
5. What is the difference between 121 and six 10's?
   What is the difference between 111 and seven 10's?
   What is the difference between 98 and three 10's?
   What is the difference between 143 and nine 10's?
   What is the difference between 116 and eight 10's?
   What is the difference between 85 and six 10's?
   What is the difference between 93 and four 10's?

1. If a man works 10 hours a day, how many hours does he work in one week not including Sunday?
2. How many inches in 10 feet?
3. How many eggs in 10 dozen?
4. How many months in 10 years?
5. How many square feet in 1 square yard? In 10 square yards?
6. If there are 10 square feet of window glass in one window, how many in 8 windows?
7. Mr. Reed had 70 sheep. Wolves killed three-tenths of them. How many were left?
8. How many square inches in a 10 inch square?
9. How many blocks of wood 1 foot square will be required to pave a hall that is 10 feet wide and 11 feet long?
10. How many square feet in the walls of a room that is 10 feet high and 10 feet square?
11. It is 6 miles to a village. A man goes and returns 5 days each week. How far does he travel in 1 week? In 3 weeks? 6 weeks? 10 weeks?
12. There are 10 rooms in a house. In each room there are 2 pictures and 3 windows. How many pictures and windows in the house?
13. In one car each seat will hold 5 persons, in another 6 persons and in another 3. In each car there are 10 seats. How many persons may be seated in the 3 cars?
14. A train of 4 cars has in the first car 45 persons, in the second 54, in the third 65, in the fourth 59. How many persons are in the train?
15. A ten story building has 10 windows in each of the first 6 stories, and 8 windows in each of the remaining 4 stories. How many windows in the entire building?
16. A table is 10 feet long, $4\frac{1}{2}$ feet wide. What is its perimeter? Its area?

1. Review page 80.
2. One dollar is written \$1 or \$1.00.
   One dollar and fifty cents is written \$1.50.
3. The point after the \$1 shows that the two figures on the right stand for cents, and the figure or figures on the left stand for dollars.
4. Two dollars and twenty-five cents is written \$2.25.
   Three dollars and six cents is written \$3.06.
   Ten dollars and sixty cents is written \$10.60.
5. Read:

\$5.01	\$9.10	\$7.09	\$10.20	\$36.50	\$30.03	\$20.19
\$8.02	\$4.15	\$9.13	\$43.75	\$84 62	\$13.40	\$12.05

6. If any number of cents, as, for example, 25, stands alone with no dollars, it may be written 25¢, or \$.25.
7. Read, \$.40, \$.16, \$.35, \$.50, \$.07, \$.10, \$.09.
8. Write in figures:
   Nine dollars and twenty-five cents; forty dollars.
   Twenty-six dollars and six cents; fourteen cents.
   Ninety dollars and ninety cents; seven cents.
   Thirty dollars and five cents; one hundred dollars.
9. What is the sum of 1 quarter, 2 dimes and 1 nickel? Write the answer.
10. What is the sum of 3 half-dollars, 1 quarter, 2 dimes and 5 pennies? Write the answer.
11. If you pay for a 3-cent car fare with a quarter, in what coins may your change be given you?
12. A street-car conductor collects 72 five-cent fares in one trip. How much money does he collect?
13. A girl buys flowers worth 40¢. If she has quarters, dimes, nickels and pennies, with what different coins may she pay for them?

NOTE.—Have dollars, half dollars, quarters, dimes, nickels and pennies where they may be observed and handled. Toy money will serve the purpose.

1. Add:

$1.55	$9.76	$9.30	$25.71	$85.94
.08	3.72	12.10	20.04	57.38
4.50	1.31	17.68	47.37	19.99
5.17	7.75	24.33	.75	6.43
8.69	.87	9.77	8.10	.98

2. Subtract:

$56.29	$54.54	$13.74	$99.99	$107.60
15.25	24.32	7.53	93.94	89.10
$10.34	$45.32	$77.55	$321.76	$446.82
7.25	22.50	35.95	I45.09	128.72

3. Multiply:

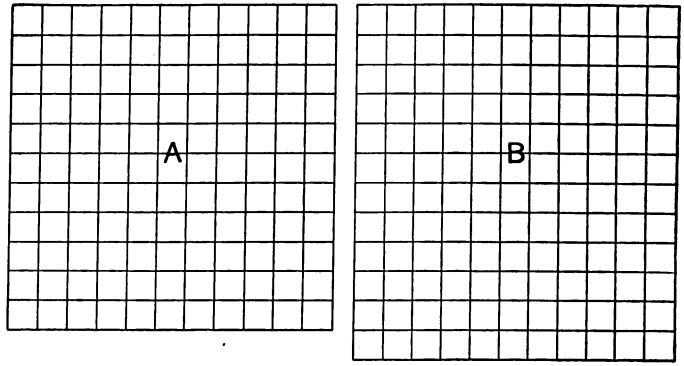
$2.63	$16.24	$37.58	$56.17	$10.29
2	3	4	5	5
$207.20	$450.75	$327.06	$525.50	$290.40
7	6	7	8	9

4. Divide:

2)$56.24	2)$38.56	3)$27.96	3)$45.21	4)$416.72
4)$892.64	5)$125.75	5)$530.50	6)$426.84	6)$558.72
7)$637.84	8)$968.72	8)$656.32	9)$468.63	

5. I bought a horse for $97.00, kept him at a livery stable for six months at $12.00 a month, and then sold him for $175.00. Did I gain or lose, and how much?
6. Mr. A. had $756.48. Mr. B. had $327.16 and Mr. C. had $258.92. How much did they all have together?

1. $1 \times 11 = 11 \times 1 =$ _____.
   $2 \times 11 = 11 \times 2 =$ _____.
   $3 \times 11 = 11 \times 3 =$ _____.
   $4 \times 11 = 11 \times 4 =$ _____.
   $5 \times 11 = 11 \times 5 =$ _____.
   $6 \times 11 = 11 \times 6 =$ _____.
   $7 \times 11 = 11 \times 7 =$ _____.
   $8 \times 11 = 11 \times 8 =$ _____.
   $9 \times 11 = 11 \times 9 =$ _____.
   $10 \times 11 = 11 \times 10 =$ _____.



2. How many 11's in A? In B?
3. A equals what part of B?
4. B equals how many A's?
5. 11 is what part of 22? Of 33? 44? 55? 66? 77 88? 99? 110? 121? 132?
6. 22 is how many 11's? What part of 33? Of 44? 55? 66? 77? 88? 99? 110? 121? 132?
7. 33 is how many 11's? How many 22's? What part of 44? Of 55? 66? 77? 88? 99 110? 121? 132?
8. 44 is how many 11's? How many 22's? How many 33's? What part of 55? Of 66? 77? 88? 99? 110? 121? 132?

1. 55 is how many 11's? How many 22's? 33's? 44's? What part of 66? Of 77? 88? 99? 110? 121? 132?
2. 66 is how many 11's? How many 22's? 33's? 44's? 55's? What part of 77? Of 88? 99? 110? 121? 132?
3. 77 is how many 11's? How many 22's? 33's? 44's? 55's? 66's? What part of 88? Of 99? 110? 121? 132?
4. 88 is how many 11's? How many 22's? 33's? 44's? 55's? 66's? 77's? What part of 99? Of 110? 121?
5. 99 is how many 11's? How many 22's? 33's? 44's? 55's? 66's? 77's? 88's? What part of 110? Of 121? 132?
6. 110 is how many 11's? How many 22's? 33's? 44's? 55's? 66's? 77's? 88's? 99's? What part of 121? Of 132?
7. 121 is how many 11's? How many 22's? 33's? 44's? 55's? 66's? 77's? 88's? 99's? 110's? What part of 132?
8. 132 is how many 11's? How many 22's? 33's? 44's? 55's? 66's? 77's? 88's? 99's? 110's? 121's?
9. Add, subtract and multiply:

39	45	50	23	47	56	73	65	89	29	99
11	11	11	11	11	11	11	11	11	11	11
93	70	84	38	87	49	96	27	71	59	77
11	11	11	11	11	11	11	11	11	11	11

10. Divide:

11)33	11)55	11)77	11)23	11)44	11)66	11)59
11)77	11)69	11)110	11)88	11)121	11)99	11)132

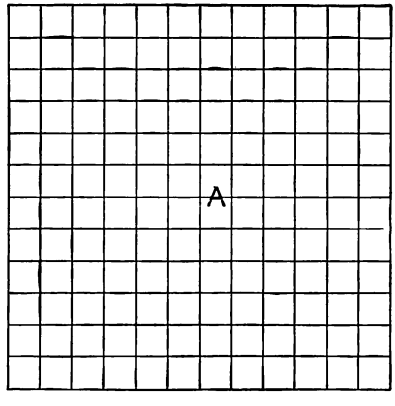
1. 33 equals how many 11's? 55 equals how many 11's?
66 equals how many 11's? 22 equals how many 11's?
44 equals how many 11's? 77 equals how many 11's?
99 equals how many 11's? 121 equals how many 11's?
110 equals how many 11's? 132 equals how many 11's?
88 equals how many 11's? 84 equals how many 7's?

2. 11 is $\frac{1}{3}$ of _____. 11 is $\frac{1}{5}$ of _____.
11 is $\frac{1}{2}$ of _____. 11 is $\frac{1}{4}$ of _____.
11 is $\frac{1}{6}$ of _____. 11 is $\frac{1}{8}$ of _____.
11 is $\frac{1}{7}$ of _____. 11 is $\frac{1}{9}$ of _____.
11 is $\frac{1}{11}$ of _____. 11 is $\frac{1}{10}$ of _____.
11 is $\frac{1}{12}$ of _____. 8 is $\frac{1}{7}$ of _____.
6 is $\frac{1}{8}$ of _____. 9 is $\frac{1}{8}$ of _____.
7 is $\frac{1}{11}$ of _____. 6 is $\frac{1}{12}$ of _____.
5 is $\frac{1}{10}$ of _____. 8 is $\frac{1}{8}$ of _____.
7 is $\frac{1}{12}$ of _____. 9 is $\frac{1}{9}$ of _____.

3. How many 11's are there in 35? In 57?
How many 11's are there in 28? In 45?
How many 11's are there in 61? In 79?
How many 11's are there in 89? In 100?
How many 11's are there in 111? In 125?
4. How many 11's are there in 88? In 74?
How many 11's are there in 66? In 85?
How many 11's are there in 99? In 76?
How many 11's are there in 55? In 65?
How many 11's are there in 39? In 43?
5. What is the difference between five 11's and three 11's?
What is the difference between seven 11's and four 11's?
What is the difference between eight 11's and five 11's?
What is the difference between nine 11's and seven 11's?
What is the difference between six 11's and two 11's?

1. What is the perimeter of an 11 inch square?
2. What is the area of an 11 inch square?
3. 3 loads of hay will winter one cow. How many cows will 33 loads winter?
4. How many inches in 3 feet? In 5 feet? 7 feet? 11 feet?
5. How many square inches in a rectangle that is 11 inches long and 3 inches wide? 11 inches long and 5 inches wide? 11 inches long and 7 inches wide? 11 inches long and 9 inches wide? 11 inches wide and 12 inches long?
6. How many days in 11 weeks and 4 days?
7. Find the cost of one-eleventh of 55 sheep at 5 dollars each?
8. What is the cost of three-elevenths of 121 cords of wood at $5 a cord?
9. Find the cost of one-eleventh of 22 sheep at $7 each. Of three-elevenths at $9 each.
10. I paid $110 house rent and one-eleventh as much for gas. How much did I pay for both?
11. Isaac planted 132 seeds in 11 hills. How many seeds did he put in one hill?
12. How many square inches in the top of a mantel that is 11 inches wide and 48 inches long?
13. All but one-eleventh of $99 was divided among 3 people. How much did each receive?
14. How many feet of ribbon will be required to bind a portfolio that is 11 inches square, allowing 4 inches extra for corners? How many yards?
15. What is the perimeter of a rectangle 7 by 11 inches? What is its area?
16. It is 11 miles from A to B. How far will one travel in making 4 round trips?

1. $1 \times 12 = 12 \times 1 =$ _____.
   $2 \times 12 = 12 \times 2 =$ _____.
   $3 \times 12 = 12 \times 3 =$ _____.
   $4 \times 12 = 12 \times 4 =$ _____.
   $5 \times 12 = 12 \times 5 =$ _____.
   $6 \times 12 = 12 \times 6 =$ _____.
   $7 \times 12 = 12 \times 7 =$ _____.
   $8 \times 12 = 12 \times 8 =$ _____.
   $9 \times 12 = 12 \times 9 =$ _____.
   $10 \times 12 = 12 \times 10 =$ _____.
   $11 \times 12 = 12 \times 11 =$ _____.



2. How many 12's in A?
3. 12 is what part of 24? Of 36? 48? 60? 72? 84? 96? 108? 120? 132? 144?
4. 24 is how many 12's? What part of 36? Of 48? 60? 72? 84? 96? 108? 120? 132? 144?
5. 36 is how many 12's? How many 24's? What part of 48? Of 60? 72? 84? 96? 108? 120? 132? 144?
6. 48 is how many 12's? How many 24's? How many 36's? What part of 60? Of 72? 84? 96? 108? 120? 132? 144?

1. 60 is how many 12's? How many 24's? 36's? 48's? What part of 72? Of 84? 96? 108? 120? 132? 144?
2. 72 is how many 12's? How many 24's? 36's? 48's? 60's? What part of 84? Of 96? 108? 120? 132? 144?
3. 84 is how many 12's? How many 24's? 36's? 48's? 60's? 72's? What part of 96? Of 108? 120? 132? 144?
4. 96 is how many 12's? How many 24's? 36's? 48's? 60's? 72's? 84's? What part of 108? Of 120? 132? 144?
5. 108 is how many 12's? How many 24's? 36's? 48's? 60's? 72's? 84's? 96's? What part of 120? Of 132? 144?
6. 120 is how many 12's? How many 24's? 36's? 48's? 60's? 72's? 84's? 96's? 108's? What part of 132? Of 144?
7. 132 is how many 12's? How many 24's? 36's? 48's? 60's? 72's? 84's? 96's? 108's? 120's? What part of 144?
8. 144 is how many 12's? How many 24's? 36's? 48's? 60's? 72's? 84's? 96's? 108's? 120's? 132's?
9. Add, subtract, and multiply:

28	53	45	33	48	57	74	66	90	38	99
12	12	12	12	12	12	12	12	12	12	12
67	89	78	49	96	50	87	29	82	59	88
12	12	12	12	12	12	12	12	12	12	12

10. Divide:

12)36 12)60 12)72 12)28 12)49 12)56 12)66

12)71 12)108 12)99 12)120 12)84 12)144 12)132

1. 36 equals how many 12's? 60 equals how many 12's?
   48 equals how many 12's? 72 equals how many 12's?
   24 equals how many 12's? 84 equals how many 12's?
   108 equals how many 12's? 132 equals how many 12's?
   96 equals how many 12's? 120 equals how many 12's?
   144 equals how many 12's? 121 equals how many 11's?
2. 12 is $\frac{1}{3}$ of _____. 12 is $\frac{1}{2}$ of _____.
   12 is $\frac{1}{6}$ of _____. 12 is $\frac{1}{4}$ of _____.
   12 is $\frac{1}{8}$ of _____. 11 is $\frac{1}{6}$ of _____.
   12 is $\frac{1}{7}$ of _____. 12 is $\frac{1}{9}$ of _____.
   12 is $\frac{1}{11}$ of _____. 12 is $\frac{1}{10}$ of _____.
   12 is $\frac{1}{12}$ of _____. 9 is $\frac{1}{8}$ of _____.
   10 is $\frac{1}{9}$ of _____. 11 is $\frac{1}{8}$ of _____.
   11 is $\frac{1}{8}$ of _____. 9 is $\frac{1}{12}$ of _____.
   7 is $\frac{1}{10}$ of _____. 11 is $\frac{1}{11}$ of _____
   9 is $\frac{1}{7}$ of _____. 10 is $\frac{1}{10}$ of _____
3. How many 12's are there in 49? In 40?
   How many 12's are there in 29? In 52?
   How many 12's are there in 65? In 74?
   How many 12's are there in 87? In 107?
   How many 12's are there in 112? In 142?
4. What is the sum of 40 and two 12's?
   What is the sum of 21 and four 12's?
   What is the sum of 23 and six 12's?
   What is the sum of 104 and eight 12's?
   What is the sum of 36 and five 12's?
   What is the sum of 16 and seven 12's?
5. What is the difference between 72 and two 12's?
   What is the difference between 96 and seven 12's?
   What is the difference between 100 and five 12's?
   What is the difference between 104 and six 12's?
   What is the difference between 144 and four 12's?
   What is the difference between 236 and three 12's?

1. Review pages 82 and 83.
2. How many months old is a boy who is 7 years old? How many weeks old is he?
3. How many months old is a boy who is 11 years old? 12 years old?
4. How many weeks in one-half a year?
5. How many minutes in one-half a day?
6. How many minutes from 7.15 a. m. to 8 o'clock a. m.?
7. How many minutes from 8 o'clock p. m. to 9.15 p. m.?
8. How many hours from 5 in the morning until 9 at night?
9. A boy goes to bed at 9 o'clock and gets up at 6. How long is he in bed?
10. A boy plays ball in the morning from 7 until 9, and in the afternoon from 4 until 6. How many hours does he play?
11 A train leaves Chicago at 9 o'clock in the morning and arrives in Cincinnati at 6 in the evening. How many hours is it on the way?
12. A train leaves Chicago at 10.30 in the morning and reaches Buffalo at 12.20 at night. How many hours is it on the way?
13. A train leaves Burlington at 9 o'clock in the morning, and reaches Chicago at 2.15 in the afternoon. How many hours is it on the way?
14. A train leaves Peoria at 11.40 a. m., reaches Streator at 1.33 p. m., and Chicago at 4.36 p. m. How long is it on the way from Peoria to Streator? How long from Peoria to Chicago?
15. A boat leaves Chicago at 8.30 in the morning, reaches Milwaukee at 11.30, and leaving Milwaukee at 6.15 in the evening, reaches Chicago at 9.15. How many hours does it take to make the round trip? How many hours from the time the boat leaves Chicago until it returns?

1 hour	1 day	1 week	1 year
60 minutes	24 hours	7 days	365 days
			52 weeks
			12 months

1. How many minutes in 1 hour? In 2 hours? 3 hours? 5 hours? 8 hours? One half an hour? One-fourth of an hour? Three-fourths of an hour?
2. What part of an hour are 10 minutes? 30 minutes? 45 minutes? 15 minutes?
3. How many hours in a week?
4. How many weeks in 147 days?
5. A boy is 8 years and 4 months old. How many months old is he?
6. The train leaves the station at 8.05. It is a 12 minutes' walk to the station. At what time must one start in order to catch the train?
7. A boy leaves home at 7.30 each morning and returns from work at 6.15 in the evening. How long is he away from home? How long is he away in 6 days?
8. A train leaves the station at 7.15 and arrives in the city at 7.42 in the morning. Returning, it leaves the city in the evening at 5.40 and arrives at 6.11. How long does a man spend on the train who goes back and forth each day for 10 days?
9. A boy leaves home for school at 8.35 and reaches the school room at 2 minutes before 9. He returns home for lunch at noon, taking the same time on the way each trip. How long is he on the way in 1 day? In 5 days?
10. School begins at 9 o'clock and dismisses at 15 minutes before 12; opens at 1.30 and closes at 3.45. How long is the forenoon session? How long is the afternoon session? How long are both together?
11. If 15 minutes were allowed for recess both morning and afternoon, how long would the sessions be together?

1. The months of the year are:

1. January (Jan.)	5. May	9. September (Sept.)
2. February (Feb.)	6. June	10. October (Oct.)
3. March (Mar.)	7. July	11 November (Nov.)
4. April (Apr.)	8. August (Aug.)	12. December (Dec)

2. What is the second month? Fifth month? Ninth month? Sixth month? Eighth month? Eleventh month? Twelfth month?
3. Learn the order of the months by number and name.
4. Seven of the months have 31 days each, four have 30 days each and one 28 days. How many days in the year?
5. The first, third, fifth, seventh, eighth, tenth and twelfth months have 31 days, the others have 30 days, except February which has 28 generally, but in Leap year 29.
6. How many days in all of the months containing 31 days? How many days in all the months containing 30 days?
7. How many days in January? April? March? February? June? August? September? July? October? November? December?
8. How many days in the first 3 months of the year? In the last 3 months of the year?
9. How many days in the first 6 months of the year? In the last 6 months of the year?
10. How many days difference between the first 6 months and the last 6 months of the year?
11. How many days in February, March and April together?
12. In April, May and June together?
13. In July and August together?
14. In September, October and November together?
15. A man left home in the morning the first day of April and returned home in the evening the last day of July. How many days was he away from home?
16. How many days in the first, third, fifth, seventh and eighth months together?

1. If \$24 pays for 8 yards of silk, how many yards can be bought for \$12?
2. What 5 equal numbers make 75?
3. How many oranges worth 4¢ each must be given in exchange for 16 lemons worth 3¢ each?
4. William paid half a dollar for a reader, a quarter of a dollar for a music book and a dime for a tablet. How much did he pay for all?
5. If 4 lemons cost 3¢, what will two dozen lemons cost?
6. In 800 pints how many quarts are there? How many gallons?
7. It requires 64 rods of fence to go around a square lot. How long is one side of the lot?
8. What is the rent of a house for a year at \$12 per month?
9. What is the cost of 3 bushels of corn at 10¢ a peck?
10. A boy worked 8 days for 50¢ a day and then had \$6. How much had he before beginning the work?
11. Edward can make a kite in 8 days, working 3 hours a day. How many days will it take him if he works 6 hours a day?
12. How much did it cost Lewis to visit the World's Fair 12 days, if he paid each day, 20¢ for car fare, 50¢ for his admission ticket and 40¢ for lunch?
13. How many feet are there in 5044 inches?
14. Find the entire cost of 11 pounds of tea at 60¢ per pound; 25 pounds of sugar at 7¢; 124 pounds of soap at 10¢; and 18 barrels of flour at \$8.37 per barrel?
15. A man bought a horse for \$85.50, and a carriage for \$53.80 more than the cost of the horse. What was the cost of both?
16. A farmer raised 8750 bushels of wheat. He sold one half of it to one man and 4200 bushels to another man. How many bushels did he have left?

1. Harold has 86 specimens in his stamp album. His father gave him 12 more. How many had he then?
2. A street car conductor collected 12 5-cent fares and 12 3-cent fares on one trip. How much did he collect?
3. One boy can jump $3\frac{1}{2}$ feet high; another boy can jump 12 inches higher. How high can the second boy jump?
4. A railroad track is made at the rate of 12 miles a month. How many miles of track can be made at the same rate in one year? In $1\frac{1}{2}$ years? In $2\frac{1}{4}$ years?
5. 970 ball cartridges were distributed among the members of a company of soldiers. Each received 12 cartridges and there were 10 left. How many soldiers were there in the company?
6. A lady spent 54 months away from home. How many years was she away?
7. How many minutes from 6 o'clock in the morning until 6 at night?
8. How many years are 9,876 months equal to?
9. A boy left home at the age of 13. He was gone until he was 55. How many months was he away from home?
10. At 11 cents a dozen, what will 180 buttons cost?
11. A tailor uses 600 buttons every month, and puts 12 on each garment. How many garments does he make?
12. Mr. Brown's salary is $2,500 a year. How much is it a month?
13. Find the cost of 12 gallons and 2 quarts of syrup at 11 cents a quart.
14. On each side of the street there are 69 trees. What did it cost to plant them, at 12 dollars each?
15. For 7 yoke of oxen I paid $84 a yoke and sold them all for $875. Did I gain or lose, and how much?
16. 12 dozen eggs cost $2.40. What will 5 dozen cost?
17. How many square inches in a square foot?

1. If 4 tons of coal cost $24, what will be the cost of 2 tons?
2. How many bushels are $\frac{5}{8}$ of 54 bushels?
3. In how many days can 4 men dig a ditch that 2 men can dig in 12 days?
4. What is the cost of 2 pecks of beans at 3¢ a quart?
5. George now has $50. How much will he have if he saves $7 a week for 4 weeks?
6. If a man buys old iron at $\frac{1}{2}$¢ a pound, how much will he pay for 48 pounds?
7. What are 4 pecks of cherries worth at 10¢ a quart?
8. At 10¢ a pound, how many pounds of grapes can be bought for 90¢ and 30¢ together?
9. John earned $\frac{1}{4}$ as much as Henry. If Henry earned 32¢, how much did both earn?
10. What will 2 gallons of oil cost at 60¢ a quart?

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11. How many feet in a line 512 inches long?
12. I sold a watch that cost $75 so as to gain $\frac{1}{5}$ of the cost. How much did I sell it for?
13. Find the difference between nine thousand eighty and seven thousand seven hundred six.
14. How many tablets at 9¢ each can be bought for $82.08?
15. How many years will it take a man to save $2880, if he saves $12 a month?
16. A building is 240 feet long and 200 feet wide. How many yards is it around the building?
17. What is the difference in value between 12 lots at $225 each and a house at $9500?
18. There are 96 boxes of soap, each containing 60 pounds. How many packages of 4 pounds each can be made from the soap?
19. How long will a barrel of oil, containing 51 gallons, last, if 2 quarts are burned each day?

1. What will be the cost of 50 feet of rope at 4¢ a foot?
2. I pay for room rent $3 a month, and for office rent $9 a month. How much do I pay a year for both?
3. How many balls weighing 8 pounds each will equal in weight 6 balls weighing 12 pounds each?
4. How many pounds of grapes at 4¢ a pound must be given for a dozen apples worth 3¢ each?
5. What will be the cost of 6 sheep, if 12 sheep cost $60?
6. How long will it take 6 men to do the work that 5 men can do in 12 days?

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7. A bushel of wheat weighs 4 pounds more than a bushel of corn. What is the difference in weight between 845 bushels of wheat and 845 bushels of corn?
8. Four loads of coal weigh respectively, 1946 pounds, 2104 pounds, 1852 pounds and 2468 pounds. If the coal were divided equally among 5 families, how many pounds will each family receive?
9. In tiling a hall, 4878 tiles were bought, but two-ninths of them were returned. How many tiles were used in tiling the hall?
10. How many strips of carpet one yard wide will be required to cover a floor that is 27 feet long and 18 feet wide? How many yards of carpet?
11. How many square inches in the top of a table three feet square?
12. What will 11 copies of Robinson Crusoe cost at 38 cents per copy?
13. How many pews in a church that will seat 760 persons, if 5 persons can be seated in each pew? If each pew will hold only 4 persons?
14. I can buy a quart of cherries for 12 cents. At that rate, what should I pay for 7 bushels?

WRITING AND READING NUMBERS.

1. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
2. How many different characters are given above?
   All numbers, no matter how large, may be represented by these figures.
3. 243

   Reading the 3 alone we say 3 ones. Reading the 4 alone we say 40 or 4 tens. Reading the 2 alone we say 200 or 2 hundreds.
4. If we were to write above each figure a separate name it would appear:

Hundreds.	Tens.	Ones.
2	4	3

   But if we were to call these all ones, we would read it as 243 ones or units.
5. How would you read 3,243?
6. This new figure, 3, placed before the other number, we call thousands. How then would you read 10,243?
7. Large numbers are divided into periods of 3 places each, thus 243 is one period. 3,243 has 2 periods. These periods are separated by commas, for convenience, as follows:

	Ones		
Thousands.	Hundreds.	Tens.	Ones.
9,	4	5	6

8. How many periods in the following numbers? Separate the periods by commas:

   346 4684 26 3781 1032

1. Read the following numbers, pointing off periods:

5784	8752	9872	6375	7365
3586	7678	6498	8988	8989
2987	5425	5674	7988	6543

2. Write the following numbers, with ones in the right hand column, with tens, hundreds and thousands in their columns as shown on the opposite page:

Seventeen. Two hundred twenty-seven. One hundred seven.

Thirty-one. Three hundred twelve. One hundred.

Sixty-eight. Sixty hundred eighty. Nine hundred.

One thousand. Eleven thousand. Eight hundred.

One thousand two hundred. Six hundred twenty-five.

One thousand sixty. Two hundred seventy-five.

One thousand six hundred fifty. One hundred seven.

One thousand ten. One thousand one hundred.

Five thousand six hundred fifty-five. Nine hundred.

Three thousand three hundred. Seventy-five.

Three thousand thirty. Four hundred twenty-five.

Six thousand six. Eight hundred seventy-nine.

3. Write in words or read from the page:

125	683	1200	4816	5090
307	469	3049	1010	9847
590	303	5060	5064	3005
483	791	2009	3100	4200

4. In writing numbers for addition and subtraction, it is more convenient to place ones underneath ones, tens under tens, hundreds under hundreds, etc.

5. Write for addition the following numbers:

640, 35, 1282, 6, 821, 64, 8, 2305

6. Write the following for subtraction:

From 872 take 6. From 6475 take 242. From 3684 take 27.

1. Review pages 90 and 91.
2. Add 2495
   6837

12	7 and 5 are 12
12	3 tens and 9 tens are 12 tens
12	8 hundreds and 4 hundreds are 1200
8	6 thousands and 2 thousands are 8000
9332	

3. A simpler way in which to set down the answers in addition is to put under each column only the right hand figure of the sum of that column, and to place the left hand figure of the sum above the next column, to be added with it.
4. In this way add the above numbers:

```
111
2495
6837
9332
```

Adding ones, $5 + 7 = 12$, or 1 ten and 2; place the 2 in the right hand column of the sum, and the one ten above the 9 in tens' column.

Adding tens, $3 + 9 + 1 = 13$ tens, or 1 hundred and 3 tens; place the 3 tens in tens' column in the sum, and the 1 hundred above the 4 in hundreds' column.

Adding hundreds, $8 + 4 + 1 = 13$ hundreds, or 1 thousand and 3 hundreds; place the 3 hundreds in hundreds column in the sum, and the 1 thousand above the 2 in thousands column.

Adding thousands, $6 + 2 + 1 = 9$ thousands, which place in thousands' column in the sum.

5. In the same way add:

2037	8226	4587	1284	7431	3368	3643
4256	975	3624	7536	1869	4852	5892
4768	3579	1928	4536	5948	6384	7463
1359	2468	3746	2879	3726	1597	1859

1. Add:

121	Adding ones, 5 + 9 + 4 = 18, or 1 ten and
2564	8; place the 8 in the ones' column of the sum,
1879	and the 1 ten above tens' column.
4195	Adding tens, 9 + 7 + 6 + 1 = 23 tens, or 2
8638	hundreds and 3 tens; place the 3 tens in tens' column in the sum, and the two hundreds above hundreds' column.

Adding hundreds, 1 + 8 + 5 + 2 = 16 hundreds, or 1 thousand and 6 hundreds; place the 6 hundreds in hundreds' column in the sum, and the 1 thousand above thousands' column.

Adding thousands, 4 + 1 + 2 + 1 = 8 thousands, which place in thousands' column in the sum.

2. In the same way add:

1729	3546	1892	1563	2623	1089	2703
2354	1273	4203	2427	1206	721	3145
4162	2098	461	5314	4257	5147	605
1431	1754	2574	256	1714	2425	2804
947	6126	1245	4678	6924	3987	3004
2753	825	3256	963	728	4058	289
1388	1268	1367	2837	1256	874	1452
5234	1834	2756	1234	473	1498	3257

3. A man had 5 farms. In the first there were 160 acres, in the second 88 acres, in the third 275 acres, in the fourth 96 acres and in the fifth 324 acres. How many acres in the five farms?

4. There are 375 pupils in one school building, 640 in another, and 583 in another. How many in the three buildings?

1. A man paid $2684 for a house, $398 for furniture and $265 for a horse and carriage. How much did he pay for all?
2. A lot cost $1540, the sidewalk $116, the house $6535, the barn $975. How much did they all cost?
3. A ship sailed 234 miles the first day, 275 miles the second day, and the third day as far as in the first two. How far did it sail in the three days?
4. Three vessels are loaded with copper. The first carries 347 tons, the second 1256 tons, the third 4384 tons. How many tons do they all carry?
5. From Chicago to Detroit it is 284 miles; from Detroit to Buffalo, 251 miles; from Buffalo to New York City, 410 miles. How far is it from Chicago to Buffalo? How far is it from Chicago to New York?
6. From Chicago to St. Louis it is 282 miles; from St. Louis to Kansas City, 277 miles. How far is it from Chicago to Kansas City by the way of St. Louis?
7. From Chicago to Burlington it is 206 miles; from Burlington to Omaha, 296 miles; from Omaha to Lincoln, 39 miles; from Lincoln to Denver, 484 miles. How far is it from Chicago to Omaha? From Chicago to Lincoln? From Chicago to Denver?
8. From Chicago to Milwaukee it is 85 miles; from Milwaukee to La Crosse, 281 miles; from La Crosse to St. Paul, 131 miles; from St. Paul to Minneapolis, 10 miles. How far is it from Chicago to La Crosse? From Chicago to St. Paul? From Chicago to Minneapolis? From Milwaukee to St. Paul?
9. From the above distances, find how far it is through Chicago from New York to St. Louis. From New York to Kansas City. To Omaha. To Denver. To St. Paul. To Milwaukee.

1. A man has 156 books in one case, 275 in another and in a third 145 more than in both of the others. How many books has he in the 3 cases?
2. A factory made 540 bicycles in January; 375 in February; 643 in March, and 856 in April. How many did it make in the 4 months?
3. A man delivered 4 loads of coal. In the first were 2150 pounds; in the second, 1975 pounds; in the third, 2260 pounds, and in the fourth, 2315 pounds. How many pounds were delivered in the 4 loads?
4. A carpenter was paid $1375.50 for building one house; $3240.75 for another; $1658.50 for a third. How much did he receive for building the 3 houses?
5. The cash sales of a certain merchant were on Monday, $253.25; Tuesday, $167.54; Wednesday, $365.80; Thursday, $453.65; Friday, $385.42, and on Saturday, $563.85. What were the cash receipts for the week?
6. A man bought a lot for $2154. He paid $453 for grading and digging a cellar, and $165.40 for a sidewalk. He built a house to cost the same amount that he had spent for the lot and all improvements. How much did he invest in the lot and house?
7. A man's salary was $2300 a year. He also received $135 interest, $426 rents, and from all other sources a sum equal to these three amounts. What was his annual income?
8. The yield from one field of wheat was 275 bushels; from a second, 562½ bushels; from a third, 458 bushels, and from a fourth, 346½ bushels. What was the entire yield from the 4 fields?
9. From A to B is 416 feet and 6 inches; from B to C, 375 feet; from C to D, 456 feet and 6 inches. How far is it from A to D?

1. Review page 93.
2. Subtract 247 from 564.

$564 = 550 + 14$
$247 = 240 + 7$
$310 + 7 = 317$

7 ones cannot be subtracted from 4 ones. Change 564 to 550 + 14. Subtracting, 7 from 14 = 7; 240 from 550 =310. 310 + 7 = 317.

3. A simpler way to write the numbers in subtraction is to place above each figure that figure to which it is to be changed.
4. In this way subtract the above numbers.

5,14
564
247
317

7 cannot be subtracted from 4. 564 must be changed to 550 + 14. The 5 in hundreds' place stays unchanged; the 6 tens become 5 tens,—place the 5 above the 6 tens; the 1 ten left from the 6 tens is added to the 4 to make 14,—so place the 14 above the 4.

Subtracting: 7 from 14 = 7; 4 tens from 5 tens = 1 ten; 2 hundreds from 5 hundreds = 3 hundreds.

5. Subtract 4526 from 6352.

5,13,4,12
6352
4526
1826

6 cannot be subtracted from 2. 5 tens and 2 must be changed to 4 tens + 12; place the 4 above the 5 tens, and the 12 above the 2.

Subtracting: 6 from 12 = 6; 2 tens from 4 tens = 2 tens.

But 5 hundreds cannot be subtracted from 3 hundreds. 6 thousands and 3 hundreds must be changed to 5 thousands + 13 hundreds; place the 5 above the 6 thousands and the 13 above the 3 hundreds. Again subtracting: 5 hundreds from 13 hundreds = 8 hundreds; 4 thousands from 5 thousands = 1 thousand.

1. Subtract:

572	744	683	567	452	334	695
246	527	256	439	326	128	478

2. Subtract:

4283	3172	7395	6476	5746	8374	9547
2657	1854	5868	3849	2828	5407	5618

3. Subtract 4687 from 9374.

$^{8\,12}_{2\,16}$ $^{}_{6\,14}$
9 3 7 4
4 6 8 7
4 6 8 7

7 cannot be subtracted from 4. 7 tens and 4 must be changed to 6 tens + 14; place the 6 above the 7 tens, and the 14 above the 4.

Subtracting: 7 from 14 = 7.

But 8 tens cannot be subtracted from 6 tens. 3 hundreds and 6 tens must be changed to 2 hundreds + 16 tens; place the 2 above the 3 hundreds and the 16 above the 6 tens.

Subtracting: 8 tens from 16 tens = 8 tens.

But 6 hundreds cannot be subtracted from 2 hundreds. 9 thousands and 2 hundreds must be changed to 8 thousands + 12 hundreds; place the 8 above the 9 thousands and the 12 above the 2 hundreds.

Subtracting: 6 hundreds from 12 hundreds = 6 hundreds; 4 thousands from 8 thousands = 4 thousands.

4. Subtract:

4352	6234	8132	9457	5321	3324	7563
2676	1395	5786	3869	1867	1657	2786
8967	8241	7241	7294	7182	9256	6842
3429	3819	398	5076	3647	7498	3715
7586	6493	4250	8593	5721	5345	5765
3248	4729	1575	7279	3809	2675	3629

1. A farm cost $3215. The buildings cost $627 less than the farm. How much did the buildings cost?
2. One railroad has 5214 miles of track; another has 2767 miles of track. How much more track has the first than the second?
3. A gentleman's income one year was $1985 and the next year it was $2140. How much greater was his income the second year?
4. Two vessels start from the same point at the same time and in the same direction. The one travels 829 miles while the second is traveling 1014 miles. How far are they apart?
5. One car contains 35,352 pounds of coal, another contains 26,475 pounds. How much more does the first contain than the second?
6. A merchant sold goods which cost him $2345, for $2610.50. What was his profit?
7. A man gave $9456 to a church and $5050 to a school, how much more did he give to the church than the school?
8. From Chicago to Cairo, Illinois, it is 365 miles; from Chicago to Jackson, Miss., it is 732 miles, and from Chicago to New Orleans, 915 miles. How far is it from Cairo to Jackson? From Cairo to New Orleans? From Jackson to New Orleans?
9. From Chicago to Indianapolis it is 194 miles; from Chicago to Cincinnati, 309 miles, and from Chicago to Washington, 903 miles. How far is it from Indianapolis to Cincinnati? How far from Indianapolis to Washington? How far from Cincinnati to Washington?
10. From Chicago to Buffalo is 539 miles; from Chicago to Albany is 837 miles; from Chicago to Boston, 1038 miles. How far is it from Buffalo to Albany? From Buffalo to Boston? From Albany to Boston?

1. The walls and ceilings of one room contain 444 square feet; those of a second room contain 139 square feet less; how many square feet in the second room?
2. A gentleman's salary is $2650 a year; if his expenses for the same time are $2025, how much does he save in one year?
3. The land of a farm is valued at $5785 and the buildings on it at $2450. How much more is the land worth than the buildings?
4. One farmer raises 7519 bushels of corn; another 6396 bushels; which man raises the more corn and how many bushels more?
5. One soldier spent 3 years and 5 months in the army; another spent 2 years and 7 months; how many months longer was the first soldier in the army than the second?
6. In buying horses a man paid $120 each for two horses and $105 each for three others. How much less did the first two together cost than the last three together?
7. One tank of water holds 200 barrels; a second tank holds 185 barrels; a third 150; how much more does the first tank hold than the second? Than the third? How much more do the first and second together hold than the third? The second and third together than the first?
8. If one ship sails 645 miles in 3 days, and another sails 717 miles in the same time, how much farther does the second sail than the first? At the same rate, how much farther would it sail in one day? In 9 days?
9. The expenses of one boy in college were $755 a year; the expenses of another boy for the same time were $105 less; of a third boy for the same time $150 less than those of the second. What were the expenses of the second and third boys?

1. Review page 95.
2. Multiply 4, 6, 8, 10, 3, 5, 7, 9, 11, each by 10. In each case, what do you do when multiplying by 10?
3. Multiply 14, 25, 73, 243, 649, each by 10.
4. To multiply one number by another number ending with one or more ciphers, is equal to multiplying by the left hand figures and adding the ciphers to the answer.
5. In this way multiply 24 by 20.

24	Place the 20 so that the 2 comes beneath the 4 of 24, leaving the cipher to the right, to be placed at the right of the answer.
20	
480	Multiplying: $2 \times 4 = 8$; $2 \times 2 = 4$; add the cipher, and we have 480.

6. Multiply:

84	96	75	68	237	485	379	946
20	30	40	50	60	70	80	90
37	49	54	124	272	234	563	847
200	300	400	500	600	700	800	900

7. Multiply 24 by 13.

24	Since 13 is 10 + 3, multiplying 24 by 13
13	equals the sum of 24 × 3 and 24 × 10.
72	24 × 3
240	24 × 10
312	

8. Multiply 76 by 15.

76	76 × 15 = 76 × 5 and 76 × 10.
15	
380	76 × 5
760	76 × 10
1140	

1. Multiply 53 by 24.

53		$53 \times 24 = 53 \times 4$ and 53×20.
24		
212	53×4	
1060	53×20	
1272		

2. Multiply 134 by 45.

134		$134 \times 45 = 134 \times 5$ and 134×40.
45		
670	134×5	
5360	134×40	
6030		

3.

67	35	56	76	145	476	398	714	974
23	32	43	53	37	27	57	83	75
523	416	312	206	102	560	345	234	630
67	22	51	34	27	46	35	18	42
297	267	285	526	808	132	114	125	863
28	35	19	25	36	47	66	48	62
169	273	286	299	473	308	315	651	943
13	44	88	120	62	73	160	23	92

4. School is in session 6 hours a day. How many hours is it in session during 26 weeks of 5 days each?
5. There are 95 rows in a potato field; if it takes 2 bushels to plant one row how many bushels will it take to plant the entire field?
6. A ship can sail 225 miles a day in fair weather, and 160 miles a day in stormy weather. How many miles can it sail in 7 days if 3 of these days are stormy?

1. A merchant buys 4 dozen pairs of shoes at $2.25 per pair. How much did they cost?
2. A boy reads one book of 316 pages every 2 weeks during the year. How many pages does he read in the year?
3. There are 189 teachers in the schools of a city. Each one has 49 scholars enrolled. How many scholars are there in the city?
4. A lot is 195 feet long and 53 feet wide. How many square feet does it contain?
5. A train runs 37 miles in an hour. How far will it run in two days at the same rate?
6. A man bought 37 horses at $69 each. How much did they cost him?
7. A merchant bought 149 rolls of carpet. Each roll contained 68 yards. How many yards of carpet did he buy?
8. There are 8 cars an hour on a street car line, and each carries 36 persons. How many persons ride on the road from 6 o'clock in the morning until 6 in the evening?
9. A conductor collects 27 5¢ fares, and 6 3¢ fares on each trip for 9 trips. How much money does he collect?
10. A boy gets $3.75 a week and spends 29¢ each week. How much money will he have at the end of 18 weeks at the same rate?
11. A boy sells 29 papers each day 6 days in a week. How many papers does he sell in a year?
12. If there are 17 apples in half a peck, how many apples are there of the same size in 13 bushels?
13. A miller bought 118 bushels of wheat at 78¢ a bushel. How much did it cost him?
14. A boy makes up a club of 17 subscribers for Harper's Young People at $1.65 each. How much money should he collect?

What is the cost of the following articles?

1. 138 pounds of creamery butter at 18¢ a pound?
2. 215 pounds of dairy butter at 17¢ a pound?
3. 348 dozen strictly fresh eggs at 9½¢ a dozen?
4. 48 bushels of new potatoes at 85¢ a bushel?
5. 464 pounds of turkeys at 8½¢ a pound?
6. 378 pounds of chickens at 9¢ a pound?
7. 17 barrels of choice apples at $3.25 a barrel?
8. 29 barrels of common apples at $2.35 a barrel?
9. 67 bunches of bananas at 78¢ a bunch?
10. 29 boxes of lemons at $2.75 a box?
11. 19 boxes of California oranges at $1.95 a box?
12. 13 crates of pineapples at $3.75 a crate?
13. 23 crates of tomatoes at $2.35 a crate?
14. 17 barrels of sweet potatoes at $3.75 a barrel?
15. 378 pounds of white sugar at 4½¢ a pound?
16. 456 pounds of yellow sugar at 4¢ a pound?
17. 17 bags of coffee at $5.83 per bag?
18. 14 tons of timothy hay at $9.50 a ton?
19. 275 bushels of barley at 43¢ a bushel?
20. 58 bushels of No 1 wheat at $1.05 a bushel?
21. 65 bushels of No. 2 wheat at 98¢ a bushel?
22. 165 bushels of No. 1 corn at 42¢ a bushel?
23. 235 bushels of No. 2 corn at 39¢ a bushel?
24. 256 bushels of white oats at 34½¢ a bushel.
25. 27 bales of cotton at $6.34 a bale?
26. 47 barrels of flour at $6 50 a barrel?
27. 39 bags of bran at $1.35 a bag?
28. 464 pounds of corn meal at 1¼¢ a pound?
29. 19 barrels of buckwheat flour at $3.25 a barrel?

NOTE.—These problems may be varied each week, or each month, by taking the market quotations in the newspapers and substituting the prices quoted for those given in the problems.

1. Review pages 98 and 99.

2. What is $\frac{1}{8}$ of 992?

$$\begin{array}{r} {\scriptstyle 16,\,32} \\ {\scriptstyle 8,\,19} \\ 8)992 \\ \hline 124 \end{array}$$

Change 9 hundreds and 9 tens to 8 hundreds and 19 tens. $\frac{1}{8}$ of 8 hundreds is 1 hundred.

Change 19 tens and 2 to 16 tens and 32. $\frac{1}{8}$ of 16 tens is 2 tens; $\frac{1}{8}$ of 32 is 4.

3. What is $\frac{1}{11}$ of 5962?

$$\begin{array}{r} {\scriptstyle 44,\,22} \\ {\scriptstyle 55,\,46} \\ 11)5962 \\ \hline 542 \end{array}$$

Change 59 hundreds and 6 tens to 55 hundreds and 46 tens. $\frac{1}{11}$ of 55 hundreds is 5 hundreds.

Change 46 tens and 2 to 44 tens and 22. $\frac{1}{11}$ of 44 tens is 4 tens; $\frac{1}{11}$ of 22 is 2.

4. What is $\frac{1}{12}$ of 7741?

$$\begin{array}{r} {\scriptstyle 48,\,61} \\ {\scriptstyle 72,\,54} \\ 12)7741 \\ \hline 645 - 1 \text{ rem.} \end{array}$$

Change 77 hundreds and 4 tens to 72 hundreds and 54 tens. $\frac{1}{12}$ of 72 hundreds is 6 hundreds.

Change 54 tens and 1 to 48 tens and 61. $\frac{1}{12}$ of 48 tens is 4 tens.

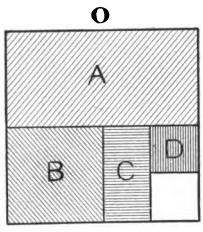
Change 61 to 60. $\frac{1}{12}$ of 60 is 5.

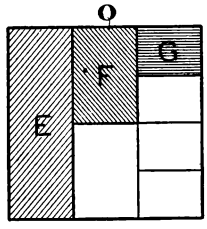
The figure that is left over in an uneven division, as the 1 here, is called the remainder, and is placed to the right of the answer.

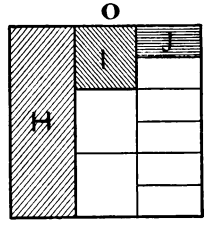
5. Divide:

6)1764	7)2269	8)2936	6)2514	7)1624	8)3387
9)2925	6)1318	7)2338	8)3656	9)8892	6)5544
7)6475	8)7576	11)4631	10)2670	8)9352	9)3978
12)2785	11)7857	10)4763	9)3565	10)5780	12)5256
8)1032	11)7078	12)6888	11)8613	9)3288	12)8676

1. At 80¢ a gallon, what is the value of one quart?
2. How many years do 1728 months equal?
3. If 8 gallons of syrup cost $12.80, what does 1 gallon cost? One pint?
4. A boy in school for 7 years and 4 months studies history during one-eighth of the time. How many months does he study history?
5. A man pays $50 a month for rent, and $\frac{1}{5}$ as much for gas. How much does he pay for both?
6. A grocer sold 6 pounds of tea for $4.80. How much did he get a pound for it? How much an ounce?
7. A person bought land for $4572, he sold it for $\frac{1}{11}$ more than it cost; for how much did he sell it?
8. How many cans holding 5 pounds each can be filled from 2 hundredweights of coffee?
9. A girl divided one-third of 195 nuts equally among 5 friends. How many did each receive?
10. How many feet long is a platform 720 inches long?
11. In a fire a man lost one-twelfth of his goods, all of which were valued at $9,876. How many dollars worth of goods did he lose?
12. A farmer owning 1,272 acres of land divided it into 2 equal parts; one of these parts he again divided into 3 equal parts, giving one of these parts to each of his 3 sons, and keeping the rest himself. How many acres had he left? How many acres had each son?
13. A book case contained 203 books, each of the 7 shelves containing the same number of books. How many books were there on a shelf?
14. A man sold 11 bicycles for $495. They were all sold for the same price. For how much did he sell each one?
15. A man sold 9 horses for $783, receiving the same price for each one. For how much did he sell each horse?







1. What part of O = A?
2. What part of A = B?
3. What part of B = C?
4. What part of C = D?
5. B = what part of O?
6. C = what part of O?
7. D = what part of O?
8. How many A's = O?
9. How many B's = O?
10. How many C's = O?
11. How many D's = O?
12. In 1 how many $\frac{1}{2}$'s? How many $\frac{1}{4}$'s? $\frac{1}{8}$'s? $\frac{1}{16}$'s?
13. What part of 1 is $\frac{1}{2}$?
14. What part of $\frac{1}{2}$ is $\frac{1}{4}$?
15. What part of $\frac{1}{4}$ is $\frac{1}{8}$?
16. What part of $\frac{1}{2}$ is $\frac{1}{8}$?
17. What part of $\frac{1}{8}$ is $\frac{1}{16}$?
18. What part of $\frac{1}{4}$ is $\frac{1}{16}$?
19. What part of $\frac{1}{2}$ is $\frac{1}{16}$?
20. $\frac{1}{2}$ = how many $\frac{1}{4}$'s? How many $\frac{1}{8}$'s? $\frac{1}{16}$'s?
21. What is the sum of $\frac{1}{2}$ and $\frac{1}{4}$?
22. What is the sum of $\frac{1}{4}$ and $\frac{1}{8}$?
23. What is the sum of $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{8}$?
24. What is the sum of $\frac{1}{8}$ and $\frac{1}{16}$?
25. What is the sum of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ and $\frac{1}{16}$?
26. What is the sum of $\frac{1}{4}$ and $\frac{1}{16}$?

1. E is what part of O?
2. F is what part of E? What part of O?
3. G is what part of F? Of E? Of O?
4. How many E's = O?
5. How many F's = O?
6. How many G's = O?
7. In 1 how many $\frac{1}{3}$'s? $\frac{1}{6}$'s? $\frac{1}{12}$'s?
8. $\frac{1}{2}$ = how many $\frac{1}{6}$'s?
9. $\frac{1}{3}$ = how many $\frac{1}{6}$'s?
10. $\frac{1}{2}$ = how many $\frac{1}{12}$'s?
11. $\frac{1}{3}$ = how many $\frac{1}{12}$'s?
12. What is the sum of $\frac{1}{2}$ and $\frac{1}{6}$?
13. What is the sum of $\frac{1}{3}$ and $\frac{1}{6}$?
14. What is the sum of $\frac{1}{6}$ and $\frac{1}{12}$?
15. What is the sum of $\frac{1}{3}$, $\frac{1}{6}$ and $\frac{1}{12}$?
16. H is what part of O?
17. I is what part of H? What part of O?
18. J is what part of I? Of H? Of O?
19. How many H's = O?
20. How many I's = O?
21. How many J's = O?
22. In 1 how many $\frac{1}{9}$'s? $\frac{1}{18}$'s?
23. $\frac{1}{3}$ = how many $\frac{1}{9}$'s?
24. $\frac{1}{9}$ = how many $\frac{1}{18}$'s?
25. $\frac{1}{3}$ = how many $\frac{1}{18}$'s?
26. $\frac{1}{2}$ = how many $\frac{1}{18}$'s?
27. $\frac{1}{6}$ = how many $\frac{1}{18}$'s?
28. What is the sum of $\frac{1}{3}$ and $\frac{1}{9}$?
29. What is the sum of $\frac{1}{9}$ and $\frac{1}{18}$?
30. What is the sum of $\frac{1}{3}$ and $\frac{1}{18}$?
31. What is the sum of $\frac{1}{3}$, $\frac{1}{9}$ and $\frac{1}{18}$?
32. What is $\frac{1}{2}$ of $\frac{1}{9}$?
33. What is $\frac{1}{3}$ of $\frac{1}{6}$?

1. What is the weight of 4 packages together, the first weighing $\frac{1}{8}$ of a pound; the second, $\frac{1}{4}$ of a pound; the third, $\frac{3}{8}$ of a pound; and the fourth, $1\frac{1}{4}$ pounds?
2. A tailor uses $4\frac{1}{3}$ yards of cloth for a coat; $1\frac{1}{6}$ yards for a vest; and $3\frac{5}{12}$ yards for a pair of trousers. How many yards does he use for the suit?
3. A man sold $3\frac{1}{4}$ pounds of butter to one customer, $2\frac{1}{2}$ pounds to another, and $4\frac{3}{8}$ to a third. How many pounds did he sell to all three?
4. A lady spends $\frac{1}{2}$ of the year in the city, $\frac{1}{4}$ of the year at the seashore, and the rest of the year in traveling? What part of the year does she spend in traveling?
5. From a piece of cloth 15 yards long, $8\frac{1}{3}$ yards were sold at one time and $2\frac{1}{6}$ yards at another time. How many yards were sold in all? How many yards were left?
6. A baker having 5 dozen biscuits, sold $1\frac{1}{3}$ dozen to one man, and $2\frac{1}{3}$ dozen to another. How many dozen did he sell in all? How many had he left?
7. $\frac{1}{2}$ of John's kite string is whip-cord, the rest is cotton string in 2 pieces, the first piece is $\frac{1}{3}$ as long as the whip-cord. What part of the entire string is the first piece of cotton string? The second piece?
8. A grocer having $\frac{2}{3}$ of a dozen of pineapples, sold $\frac{1}{2}$ of them. What part of a dozen did he sell?
9. One boy stays in the country $\frac{1}{3}$ of each year, a second boy stays $\frac{1}{3}$ as long as the first boy? What part of the year does the second boy stay?
10. How many boxes holding $\frac{1}{4}$ of a pound of candy each, can be filled from $\frac{1}{2}$ a pound? From $\frac{3}{4}$ of a pound? From $1\frac{1}{4}$ pounds?
11. A man bought $1\frac{1}{4}$ pounds of nuts and divided them equally among his 4 children. What part of a pound did each receive?

1. A boy bought at the grocery 1 pound of sugar, $1\frac{1}{2}$ pounds of butter and $\frac{1}{4}$ pound of tea. How many ounces did the three weigh together?
2. A man bought $3\frac{1}{2}$ pounds of sugar and returned 12 ounces of it. How many ounces did he keep?
3. A grocer put 5 pounds of sugar into 2 equal packages. How many ounces in each package?
4. A woman bought at the grocery $1\frac{1}{2}$ pounds of butter at 24¢ a pound; a quarter of a pound of tea at 60¢ a pound and 4 pounds of sugar at $5\frac{1}{2}$¢ a pound. How much is her bill?
5. A clerk sold one customer 7 yards of cloth at 80¢ a yard; 9 yards of ribbon at 16¢ a yard and $\frac{1}{2}$ a yard of velvet at $1.50 a yard. What was the amount of his sale?
6. A man bought a hatchet for 75¢, a saw for $1.25, $6\frac{1}{2}$ pounds of nails at 4¢ a pound, and 2 dozen screws at 9¢ a dozen. What was his bill?
7. A grocer bought 3 barrels of sugar containing 198 pounds each, at 4¢ a pound; a box of tea containing 23 pounds at 45¢ a pound, and 2 sacks of coffee containing 75 pounds each at 20¢ a pound. What was his bill?
8. A merchant bought 3 dozen pairs of shoes at $2.25 per pair, one dozen at $2.50 a pair, and one-half dozen at $2.75 a pair. How much was his bill?
9. A bookseller bought 50 books at 36¢ each, 2 dozen boxes of paper at 13¢ each, 9 dozen pencils at 11¢ a dozen. What was his bill?
10. Railroad fare is 3¢ per mile. From Chicago to Aurora it is 37 miles; from Aurora to Galesburg, 126 miles; from Galesburg to Burlington, 43 miles. What is the fare from Chicago to Aurora? From Aurora to Galesburg? From Galesburg to Burlington? What is the fare from Chicago to Burlington?

1. A man owns a lot on which he builds 2 houses. The first is $24\frac{1}{2}$ feet wide and 63 feet long; the second is 25 feet wide and $62\frac{1}{2}$ feet long. What is the area of the ground covered by the two houses?
2. The lot is 125 feet long and 60 feet wide. What is the area of the ground not covered by the houses?
3. A street is 360 feet long and 60 feet wide; there is a sidewalk 7 feet wide on each side. What is the area of the remainder of the street?
4. A railroad runs a train of 3 cars every 30 minutes from 6 o'clock in the morning until 6 in the evening. How many cars run over the track in the 12 hours?
5. A man mails 40 letters requiring 2¢ postage each, 375 circulars requiring 1¢ postage each, and 36 packages which require 4¢ each. What is the cost of the postage on the whole?
6. A man subscribed for the Youth's Companion for one year at $1.75, for St. Nicholas for 6 months at $2.50 a year, for the Century for 3 months at $4 a year and for McClure's for 18 months at $1 a year. How much must he pay for all the subscriptions?
7. A boy bought 24 1-cent papers at $\frac{3}{4}$¢ each, 16 2-cent papers at $1\frac{1}{4}$¢ each and 5 10-cent magazines at 7¢ each. He sold his entire stock at regular prices. How much money did he make?
8. A boy gets $3.75 for a week's work; he pays 10¢ each day for lunches, buys a ball for 15¢ and a stamp album for 75¢. How much money does he have left at the end of the week?
9. A man gets $17.50 a week for four weeks. In that time he pays $11 for rent, buys half a ton of coal at $7.50 a ton, pays $12.75 for groceries and $6.93 for dry goods. How much money has he left from his salary?

1. 48 men dig a cellar in 18 days. In how many days could 12 men have dug it?
2. How many $\frac{1}{2}$-pound packages can be made from 18 chests of tea, each containing 60 pounds?
3. How many pounds of sugar at 6¢ a pound will equal in value 258 gallons of syrup at 40¢ a gallon?
4. A merchant exchanged 70 barrels of sugar at $22.50 per barrel for flour at $5 per barrel. How many barrels of flour did he receive?
5. If 250 desks which cost $9 each are sold for $12 each, what will be the gain?
6. What will 144 quarts of strawberries cost at 50¢ a peck?
7. What is the difference between 829 tons and $\frac{1}{1\frac{1}{2}}$ of 9648 tons?
8. Mr. Monroe spends $139.65 in January, $15.25 more in February than in January, and $15.25 more in March than in February. How much does he spend in all?
9. A gentleman paid for a purchase with a $5 bill, and received back in change one half-dollar, 3 quarters, 2 dimes and 2 nickels. What was the amount of his change? What was the amount of his purchase?
10. Find the distance in inches around a room that is 18 feet long and $14\frac{1}{2}$ feet wide.
11. A woman received $10,000 for a farm. She gave $1000 to a church, $500 to a school, and $2980 to a hospital. How much of the money had she left?
12. A carpenter bought 464 feet of lumber at one time and $\frac{1}{8}$ as much at another time. How many feet did he buy in all?
13. There are 387 squares of marble in the floor of the dining-room and seven-ninths as many in the parlor floor. How many squares in the parlor floor? How many in both floors?

1. A man paid $24 for a suit of clothes, $\frac{1}{6}$ as much for a pair of shoes, $\frac{1}{8}$ as much for a hat. What was the cost of the entire outfit?
2. A man paid for his house $4860; the lot cost him $\frac{1}{3}$ as much as the house; the grading, fencing and street cost $\frac{1}{4}$ as much as the lot. What did the three cost him?
3. A bookseller sold $128 worth of books in one day. They cost him $\frac{1}{8}$ less than he sold them for. How much was his profit and what did the books cost him?
4. A bookseller sold 64 books at $12\frac{1}{2}¢$ each, 48 books at $15¢$ each, and 60 books at $25¢$ each. How much money did he receive?
5. There are 60 pupils in the school room. 24 of them have 4 books each, 26 of them have 3 books each, and the remainder have 5 books to each group of 2 pupils. How many books are there in the room?
6. A man is 48 years old; his wife is 44; the oldest son is $\frac{1}{4}$ as old as the father and mother together; the second son is $\frac{1}{3}$ as old as the father. What is the sum of the ages of the father, mother and two boys?
7. A boy left home for college on the morning of September 5th. He returned home on the morning of December 23rd. How many days was he away from home?
8. A family bought 1 quart of milk every day in January, February and March of a Leap Year. How many gallons did they buy in the 3 months?
9. For $20 in gold a man received a five-dollar bill, 7 silver dollars, and the rest equally in half dollars and quarters. How many half dollars did he get? How many quarters?
10. How many yards of wire are needed to build a fence six wires high around a garden 48 feet wide and 72 feet long?

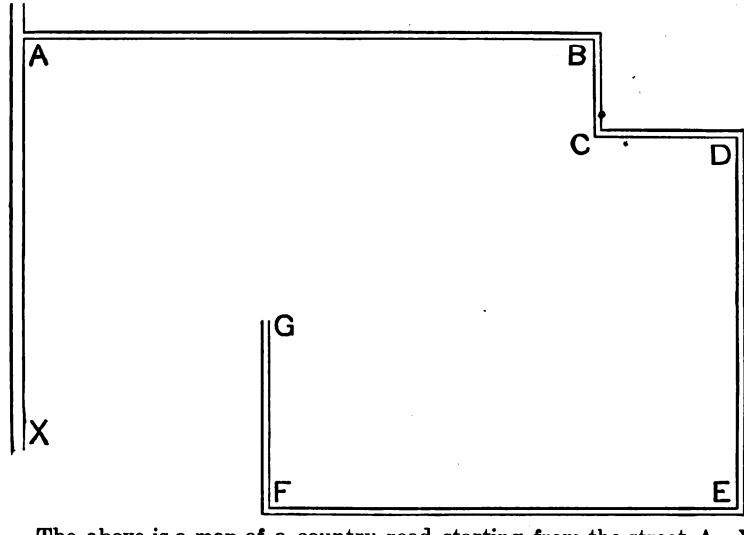
PART THIRD.

1. Measure these two lines. Suppose them to be drawn to the scale of 1 inch to 3 feet.
2. What does the short one represent?
3. How many times the short line is the long one?
4. If the short line represents 1 yard, how many yards does the long one represent?
5. If the short line represents 3 feet, how many feet does the long one represent?
6. We will call the long line 1 rod.
7. How many feet in a rod?
8. How many yards in a rod?
9. How many feet in a yard?
10. How many inches in a foot?
11. 320 times what the long line represents is a mile.
12. How many yards in a mile?
13. How many feet in a mile?
14. How many rods in a mile?
15. A boy walks 60 rods. How many yards does he walk? How many feet?
16. A lot 6 rods wide is divided into 2 equal lots. How many feet wide is each lot?
17. A lot is 3 rods wide and 6 rods long. How many yards around it?
18. A bridge is 8 rods long and 2 rods wide. How many feet long and wide is it?
19. A rope 12 rods long is wound into coils, each coil using 6 feet of rope. How many coils are there?
20. How many rods around a farm 2 miles square?

1 foot	1 yard	1 rod	1 mile
12 inches	3 feet	5½ yards	320 rods
	36 inches	16½ feet	1760 yards
			5280 feet

1. A block is 18 rods wide and 22 rods long. How many yards is it around the block? How many feet?
2. A boy lives 64 rods from school. If he goes home at noon how many yards does he travel in a school week?
3. A man lives 2½ miles from his office. He goes to his office each day. How many rods does he travel from Monday morning until Saturday night?
4. A lot is 82½ feet wide and 165 feet long. What is the cost of fencing it at 18¢ a yard? At 75¢ a rod?
5. The rails on a railroad are 2 rods long. How many rails are there in a mile of railroad track?
6. It costs 85¢ a linear foot for making a street. What will be the cost of a quarter of a mile of such a street?
7. A boy rode 7⅛ miles on his wheel. How many rods did he ride?
8. It is 38 yards west from the door of John's house to the school. If he went to the store 45 yards east and then to school, how many yards did he walk? How many feet?
9. How many yards of border will be required for a room 21 feet long and 18 feet wide?
10. The tire of a wheel measures 6 feet. How many revolutions will it make in going 24 rods?
11. A boy steps 2 feet. How many yards will he step in 30 steps? How many steps will he take in walking a mile? In walking ½ a mile? In walking ¼ of a mile?
12. If there are 8 blocks in a mile, how many feet are there in a block?
13. A field is ½ a mile square. How many miles will a man travel in going around the field?

1. This line is drawn to a scale of 1 inch to the mile. A man goes from C to A and returns to B. How many miles has he traveled?
2. From B he goes to C and returns to B. How many miles has he traveled?
3. From B he goes to A and back to B. How many rods has he traveled?
4. Suppose the line to be drawn to a scale of 6 rods to 1 inch. How many yards from A to B? From B to C? From A to C?
5. John lives at B, Ned at A and the school-house is at C. John goes to Ned's house in the morning, then to school, and home in the evening. How many rods has he traveled?
6. The next day Ned goes to school and John is not there. He goes back to John's home and they go back to school together and each returns home in the evening. How many rods has Ned traveled? How many yards?
7. Let each boy count the number of steps to his home from school, write it down and the next day find how many feet the distance is if his steps have been 2 feet long. If he steps $1\frac{1}{2}$ feet. Tell whether it is nearer a mile, $\frac{1}{2}$ a mile, $\frac{1}{4}$ of a mile or $\frac{1}{8}$ of a mile.
8. How many feet in $\frac{1}{2}$ a mile? $\frac{1}{4}$ of a mile? $\frac{1}{8}$ of a mile?
9. 2 boys start out from home and walk in opposite directions. They take 8 steps to the rod. How many rods apart are they when they have each taken 80 steps?
10. Is the distance they are apart nearest to $\frac{1}{4}$, $\frac{1}{2}$ or to a mile?
11. A boy takes 80 steps of 2 feet each in a minute. How far will he walk in 15 minutes? Is the distance nearer to $\frac{1}{4}$ or $\frac{1}{2}$ a mile?



The above is a map of a country road starting from the street A—X, and drawn to a scale of one inch to four miles.

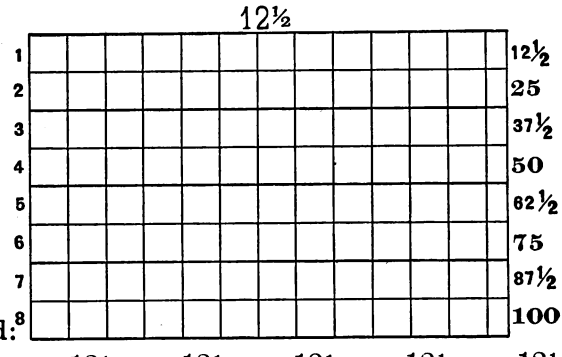
1. How many miles is it from the street to B? To D? To G?
2. How many miles is it from B to G? From D to G?
3. How far is the road B C from the street? How far is D E?
4. How far is the road F G from the road D E?
5. How far is the road F G from the street?
6. How far, in a straight line, is the road A B from the road F E?
7. How far is the end of the road at G from the nearest point of the street?
8. How far is G from the nearest point in the road A B?
9. The distance from B to C is what part of the distance from F to G? What part of D to E? What part of C to D? What part of A to B? What part of D to F?
10. The distance from F to G is what part of the distance from A to B? What part of the distance from D to E?
11. The distance from C to D is what part of the distance from A to B? What part of the distance from F to G?

(Call one inch on the map one-half a mile.)

1. How far is it from A to B? From A to C? From A to D? From B to C? From E to F? From E to G?

(Call one inch on the map one-third of a mile.)

2. How far is it from A to B? From A to C?
3. If a man can walk from A to B in 15 minutes, how long will it take him at the same rate to walk from D to E?
4. If the wheels of a bicycle turn twice around in going one rod, how many times will they turn in going six miles?
5. John starts on his bicycle and rides $1\frac{1}{2}$ miles in 8 minutes; Harry rides at the same speed for 5 minutes. How many more rods does John ride than Harry?
6. There are in a room 5 windows 9 feet high. How many yards of material of single width will be required to make curtains for the windows, making 2 curtains for each window? What will be the cost at 6¢ a yard?
7. The windows in a school room are 7 feet high and there are 4 of them. How many yards of material will be required for one curtain at each window if 1 foot is allowed extra for each curtain? What will be the cost of the material at 25¢ a yard?
8. Each step in the staircase is 6 inches high and 1 foot wide. How many feet of stair carpet will be required if there are 12 steps? What will be the cost of the carpet at 75¢ a yard?
9. In a library $35\frac{1}{2}$ feet long and $23\frac{1}{2}$ feet wide, there are book shelves on one side and one end of the room. How many feet of boards, in length, will be required to make 5 of these shelves?
10. A pile of 10 blocks is placed 6 yards from a basket. If a child starts at the blocks and carries 1 at a time to the basket until he has carried all the blocks, and returns, how far will he have walked?



1. Add:

$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
		$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
			$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
				$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
					$12\frac{1}{2}$	$12\frac{1}{2}$
						$12\frac{1}{2}$

2. $12\frac{1}{2} \times 2 =$ _____. $12\frac{1}{2} \times 6 =$ _____.
   $12\frac{1}{2} \times 3 =$ _____. $12\frac{1}{2} \times 7 =$ _____.
   $12\frac{1}{2} \times 4 =$ _____. $12\frac{1}{2} \times 8 =$ _____.
   $12\frac{1}{2} \times 5 =$ _____.
3. $25 \times 2 =$ _____. $25 - 12\frac{1}{2} =$ _____.
   $25 \times 3 =$ _____. $50 - 12\frac{1}{2} =$ _____.
   $25 \times 4 =$ _____. $75 - 12\frac{1}{2} =$ _____.
   $50 \times 2 =$ _____. $100 - 12\frac{1}{2} =$ _____.
4. 25 is what part of 50? Of 75? Of 100?
   50 is what part of 75? Of 100?
   75 is what part of 100?
5. $12\frac{1}{2}$ is what part of 25? Of 50? Of 75?
   $12\frac{1}{2}$ is what part of 100?
6. How many times $12\frac{1}{2}$ is $37\frac{1}{2}$? $62\frac{1}{2}$? $87\frac{1}{2}$?
7. What part of 100 is $37\frac{1}{2}$? $62\frac{1}{2}$? $87\frac{1}{2}$?

1. A woman sold 4 dozen eggs at $12\frac{1}{2}¢$ a dozen. How much did she get for them?
2. What is the cost of 5 pounds of butter at $12\frac{1}{2}¢$ a pound?
3. How many $12\frac{1}{2}¢$ in a dollar? In $\frac{1}{4}$ of a dollar? In a half dollar? In $75¢$?
4. A boy bought a dozen little chickens at $12\frac{1}{2}¢$ each. The feed cost him $75¢$ and he sold the chickens when they were grown at $25¢$ each. How much did he make in the chicken business?
5. A farmer hired a boy to watch his corn-field and promised him $12\frac{1}{2}¢$ for every 3 squirrels and $12\frac{1}{2}¢$ for every 5 crows that he killed. At the end of a week the boy turned in 6 squirrels and 10 crows. How much money should the farmer pay him?
6. A woman bought 10 yards of ribbon at $12\frac{1}{2}¢$ a yard and 8 yards of silk at $87\frac{1}{2}¢$ a yard. What was the cost of the ribbon? Of the silk? Of both together?
7. A boy bought a ball for $12\frac{1}{2}¢$, a bat for $25¢$ and a glove for $37\frac{1}{2}¢$. How much did he pay for his base-ball outfit?
8. A girl bought a doll for $25¢$, a tablet and pencil for $12\frac{1}{2}¢$ and a book for $37\frac{1}{2}¢$. How much change should she receive if she gave the storekeeper $1?
9. A book-seller bought 5 books at $12\frac{1}{2}¢$ each, 8 boxes of paper at $12\frac{1}{2}¢$ each and 7 dozen pencils at $12\frac{1}{2}¢$ a dozen. What was the cost of the whole?
10. A hall is $12\frac{1}{2}$ feet wide and 6 times as long. How long is it?
11. A board is $12\frac{1}{2}$ inches wide and 7 times as long. How many inches long is it?
12. A boy bought 3 dozen eggs for $\frac{3}{8}$ of a dollar, and sold them for $\frac{3}{4}$ of a dollar. What part of a dollar did he gain? How many cents a dozen did he gain?

1. A clerk sold 1 piece of silk cord $4\frac{1}{2}$ feet long, another $7\frac{1}{2}$ feet long. How many yards did he sell in all?
2. A man wishes to put 2 rows of wire above a fence 12 rods long. How many feet of wire does he need?
3. How many yards of carpet are needed to lay one width in a hall $22\frac{1}{2}$ feet long and on a flight of 16 stairs, each step requiring $1\frac{1}{2}$ feet of carpet?
4. John rides 12 miles, his brother $\frac{3}{4}$ as far. How many rods does his brother ride?
5. A field is 160 rods long and 80 rods wide; how many feet of wire will enclose it twice?
6. A man left home and drove 5 miles east; turned and drove 1,000 rods back. How far was he from home?
7. The hall of a hotel is 14 yards long and $16\frac{1}{2}$ feet wide. How many feet of border will be required to go around the walls?
8. How many boards 12 feet long will make a fence 1 mile long, if there are 3 rows of boards?
9. One walk is 150 feet long, a second 80 feet long, and a third 240 feet. What is the length in yards of all together?
10. One rail of a track is 30 feet long. How many miles long is a track having on 1 side 352 rails, each 30 feet long?
11. A street-car company lays 7 miles of track, $\frac{1}{4}$ of it running east and west, the rest north and south. How many rods of track are there in all? How many running each direction?
12. A boy walked 2 miles, taking steps 2 feet long. How many steps did he take?
13. In building a fence around a field $\frac{3}{4}$ of a mile long and $\frac{1}{2}$ of a mile wide, a farmer used old material for 2,250 yards, and purchased the rest. How many yards of fencing did he buy?

1. A horse can go 1 mile in 6 minutes. How many rods can he go in an hour?
2. A carriage wheel measures 12 feet around the outside. How many times will it turn around in going 3 miles? In going 5 miles?
3. A wheel is 10 feet around the outside. How many yards will it move in going around 120 times on the ground?
4. A lot is 23 yards wide. How many rods will a man walk in crossing the lot 8 times?
5. A boy's top-string is 2 yards long, he cuts from it a piece 18 inches long. What is the length in feet of the remaining part?
6. A mile of gas pipe is laid at $5 a rod. What is the cost of laying?
7. A block is 18 rods wide and 24 rods long. How many steps of 2 feet in length will a boy take in going around it once?
8. A street car goes 10 miles in an hour. At the same rate, how many rods will it go in 15 minutes?
9. At 25¢ a foot, what will be the cost of 4 rods and 1 foot of hose?
10. A boy starts from his home and takes 80 steps of 2 feet each in a minute. He walks at that rate as far as he can go and return in 10 minutes. How far was he from home when he turned to go back?
11. A man walked 4 miles an hour and a boy walked 2 miles an hour. They started in the same direction at the same time. How many rods apart were they in 15 minutes?
12. What will be the cost of a ditch half a mile long at $1.25 a rod?
13. What is the distance around a lot which is 50 yards and 2 feet long and 8 yards and 1 foot wide?

1. Give the number of

12's in			3's in			11's in	
24	30	84	12	6	36	77	110
42	144	66	24	27	15	55	99
18	132	108	10	22	21	132	33
96	60	72	18	30	14	66	121
48	36	120	9	27	33	88	44

2. $12 \times 4 =$ ____. $12 \times 5 =$ ____. $3 \times 11 =$ ____.
   $12 \times 9 =$ ____. $12 \times 3 =$ ____. $3 \times 12 =$ ____.
   $12 \times 7 =$ ____. $12 \times 12 =$ ____. $3 \times 5 =$ ____.
   $12 \times 10 =$ ____. $12 \times 6 =$ ____. $3 \times 8 =$ ____.
   $12 \times 8 =$ ____. $12 \times 11 =$ ____. $3 \times 9 =$ ____.

3. $12 \times 2\frac{1}{2} =$ ____. $12 \times 10\frac{1}{4} =$ ____. $3 \times 8\frac{1}{3} =$ ____.
   $12 \times 5\frac{1}{4} =$ ____. $12 \times 9\frac{1}{3} =$ ____. $3 \times 5\frac{1}{3} =$ ____.
   $12 \times 7\frac{1}{3} =$ ____. $12 \times 3\frac{1}{2} =$ ____. $3 \times 7\frac{1}{3} =$ ____.
   $12 \times 6\frac{1}{4} =$ ____. $12 \times 12\frac{1}{4} =$ ____. $3 \times 9\frac{1}{3} =$ ____.
   $12 \times 8\frac{1}{2} =$ ____. $12 \times 4\frac{3}{4} =$ ____. $3 \times 12\frac{1}{3} =$ ____.

4. $5\frac{1}{2}$ is what part of 11? What part of $16\frac{1}{2}$? Of 22?

5. $5\frac{1}{2} \times 2 =$ ____. $16\frac{1}{2} \times 3 =$ ____. $11 \times 8 =$ ____.
   $5\frac{1}{2} \times 4 =$ ____. $16\frac{1}{2} \times 6 =$ ____. $11 \times 9 =$ ____.
   $5\frac{1}{2} \times 7 =$ ____. $16\frac{1}{2} \times 4 =$ ____. $11 \times 12 =$ ____.
   $5\frac{1}{2} \times 8 =$ ____. $16\frac{1}{2} \times 2 =$ ____. $11 \times 4 =$ ____.
   $5\frac{1}{2} \times 6 =$ ____. $16\frac{1}{2} \times \frac{1}{3} =$ ____. $11 \times 7 =$ ____.
   $5\frac{1}{2} \times 9 =$ ____. $16\frac{1}{2} \times \frac{2}{3} =$ ____. $11 \times 10 =$ ____.
   $5\frac{1}{2} \times 3 =$ ____. $16\frac{1}{2} \times 1\frac{1}{3} =$ ____. $11 \times 6 =$ ____.
   $5\frac{1}{2} \times 10 =$ ____. $16\frac{1}{2} \times 2\frac{2}{3} =$ ____. $11 \times 11 =$ ____.

6. $\frac{1}{2}$ of 320 = ____. $\frac{1}{4}$ of 320 = ____.
   $\frac{1}{8}$ of 320 = ____. $\frac{1}{16}$ of 320 = ____.
   $\frac{1}{10}$ of 320 = ____. $\frac{1}{32}$ of 320 = ____.

7. $2 \times 320 =$ ____. $3 \times 320 =$ ____.
   $5 \times 320 =$ ____. $4 \times 320 =$ ____.

8. What part of 320 is 40? What part is 80? 20?

1. If 1 cord of wood cost $\$5\frac{1}{2}$, how much will 4 cords cost?
2. How many 12 pound packages of sugar can be made from 72 pounds?
3. How many bins holding $5\frac{1}{2}$ bushels can be filled from $16\frac{1}{2}$ bushels of grain?
4. A man walked $16\frac{1}{2}$ miles 1 day and $5\frac{1}{2}$ miles the next. How many miles did he walk in all? How many miles farther the first day than the second?
5. At $\$5\frac{1}{2}$ a ton, how many tons of coal can be bought for $\$22$?
6. 11 men received $\$132$ for digging a ditch. They shared the money equally. What did each one receive?
7. A farmer bought 16 sheep at $\$3$ each and sold them at the rate of 3 for $\$12$. What was the entire cost? How much did he receive? What was his gain?
8. A flag staff 48 feet high was broken into 2 pieces, 1 piece being 3 times as long as the other. What was the length of each piece?
9. What is the cost of a bale of cotton containing 400 pounds, at $5\frac{1}{2}\cent$ a pound? At $7\cent$ a pound?
10. From a bin holding 77 bushels, 55 bushels were taken out. How many bins holding $5\frac{1}{2}$ bushels each can be filled from the remainder?
11. $\$40$ a month is paid by a man for his rent; his other monthly expenses are 7 times as much. What is the amount of his other expenses? Of total expenses?
12. What is the average rate of speed made by a train traveling 320 miles in 8 hours?
13. A grain dealer sold 320 bushels of corn in 40 bushel loads. How many loads did he sell?
14. A bushel of wheat weighs 4 pounds more than a bushel of corn. What is the difference in weight between 80 bushels of each?

1. Draw diagrams on a scale of 3 feet to 1 inch for rooms of the following dimensions:

   12 feet long and 9 feet wide.
   24 feet long and 18 feet wide.
   30 feet long and 27 feet wide.
   33 feet long and 21 feet wide.
   15 feet long and 12 feet wide.
   21 feet long and 12 feet wide.
   27 feet long and 15 feet wide.
   24 feet long and 15 feet wide.

   Give perimeters in feet. In yards.

2. Draw diagrams on a scale of 3 yards to 1 inch, for lots of the following dimensions:

   15 yards long and 12 yards wide.
   18 yards long and 15 yards wide.
   12 yards long and 6 yards wide.
   15 yards long and 9 yards wide.
   24 yards long and 12 yards wide.
   33 yards long and 15 yards wide.
   21 yards long and 12 yards wide.
   27 yards long and 12 yards wide.

   Give perimeters in yards. In feet.

3. Draw diagrams on a scale of $\frac{1}{8}$ mile to $\frac{1}{2}$ inch, for fields of the following dimensions:

   $\frac{1}{2}$ mile long and $\frac{1}{4}$ mile wide.
   1 mile long and $\frac{1}{2}$ mile wide.
   2 miles long and $1\frac{1}{2}$ miles wide.
   $1\frac{1}{2}$ miles long and $\frac{1}{2}$ mile wide.
   $1\frac{1}{4}$ miles long and 1 mile wide.
   $\frac{3}{4}$ mile long and $\frac{1}{2}$ mile wide.
   $1\frac{1}{2}$ miles long and $\frac{3}{4}$ mile wide.
   $1\frac{1}{4}$ miles long and $\frac{3}{8}$ mile wide.

   Give perimeters in miles. In rods.

1. Review page 176.
2. When dividing by numbers larger than 12, the changes may more easily be written below the number, as shown in 3. This way of dividing is called Long Division, but the plan is the same as in Short Division.

3. Divide 559 by 13.

```
  43
13)559
  52
  39
  39
```

Change 55 tens and 9 to 52 tens and 39; write the 52 tens below the 55, draw a line, and beneath it write the 39, placing the 3 tens in tens' column.

Now divide: 52 tens ÷ 13 = 4 tens; 39 ÷ 13 = 3, making the answer 43. Write this above the 559, placing each figure in its proper column, the 4 tens above the 5 tens, the 3 above the 9.

4. Divide 4874 by 21.

```
  232-2/21
21)4874
  42
  67
  63
  44
  42
   2-rem.
```

Change 48 hundreds and 7 tens to 42 hundreds and 67 tens; write the 42 hundreds below the 48, draw a line, and beneath it write the 67 tens, placing the 6 hundreds in hundreds' column.

Now divide: 42 hundreds ÷ 21 = 2 hundreds. Place this part of the answer above the 4,874, in hundreds' column. Change 67 tens and 4 to 63 tens and 44, writing them in the same way as before.

Now divide: 63 tens ÷ 21 = 3 tens. Write this part of the answer in its proper column, beside the 4 hundreds.

Change the 44 to 42 and 2. 42 ÷ 21 = 2. Write this in the ones' column of the answer.

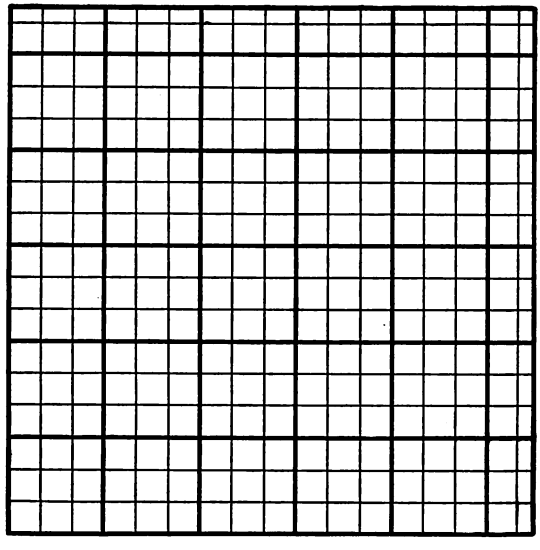
The division of the remainder, 2, may be expressed by writing $\frac{2}{21}$ after the rest of the answer, making $232\frac{2}{21}$.

1. Divide:
   264 by 11, by 21, 31, 41, 51.
   528 by 12, by 22, 32, 42, 52.
   377 by 13, by 23, 33, 43, 53.
   434 by 14, by 24, 34, 44, 54.
   675 by 15, by 25, 35, 45, 55.
   352 by 16, by 26, 36, 46, 56.
2. Divide each of the following numbers by each of the above series.

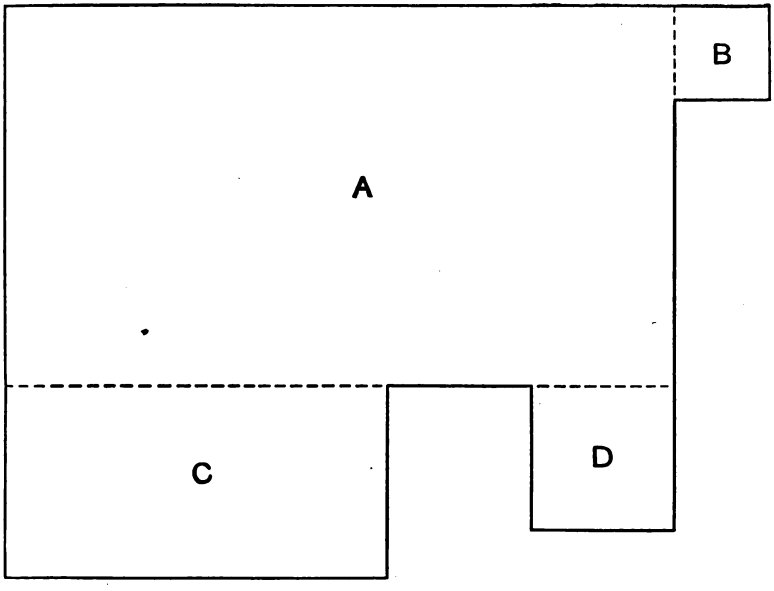
118	154	172	120	156	188
213	237	248	253	269	293
3123	3234	3345	3456	3567	3785
4678	5788	6879	7890	8901	8493
9012	8123	7243	6542	5987	9648

3. A man paid $31.46 for eggs at 13¢ a dozen. How many dozen did he buy?
4. A tank holds 300 barrels of water. When it is $\frac{1}{15}$ full, how many barrels does it hold? How many gallons?
5. In a flock of 1,736 sheep, $\frac{1}{14}$ of the number were lambs. How many lambs were there?
6. A man bought 20 feet of piping for $6.40. How much per foot did it cost? How much per inch?
7. A man bought 18 yards of cloth for $36.72. How much did it cost a yard?
8. A man bought 25 pictures, paying for them $925. If each one cost the same, what was the cost of one picture?
9. A grocer sold 19 pounds of butter for which he received $4.37. How much per pound did he get?
10. A boy can ride 15 miles an hour on his bicycle. At the same rate how many hours would it take him to ride 5,136 miles?
11. The schoolroom floor contains 1,100 square feet and is 25 feet wide. How long is it?

1. A grain dealer sold 665 bushels of oats in loads of 35 bushels each. How many loads did he sell?
2. A man paid $79.58 for butter at 23¢ a pound. How many pounds did he buy?
3. A lot contains 4,231 square feet and is 23 feet wide. How long is it?
4. If 24 horses cost $1,080, what is the average cost of one?
5. 3,300 bushels of grain were put into 22 bins of equal size. How many bushels in each bin?
6. In laying a railroad 1,200 miles long, one-sixth of it was built over hilly ground, and one twenty-fourth of it over water, the rest ran over level ground. How many miles of railroad in each part?
7. If there are 40 single seats in each room in a schoolhouse, how many rooms will be needed to seat 1,680 pupils? To seat 8,640 pupils?
8. A merchant bought 2 dozen pairs of shoes for $52.80. How much did he pay a pair?
9. How many ponies at $50 each can be bought for $1,000?
10. A bookseller bought 1,475 books. They were packed in 15 boxes with an equal number in each box. How many books were there in each box?
11. A coal dealer shipped 2,916 tons of coal in cars of 18 tons each. How many such cars did he ship?
12. A grocer bought a quantity of butter at 22 cents a pound, and paid for it all $10.56. How many pounds did he buy?
13. How many packages containing 24 ounces each can be made from 15 pounds of tea?
14. A man sells horses at $85 apiece. How many horses must he sell to receive $1,020?
15. How many loads of corn, each 22 bushels, will be needed to fill a crib that holds 264 bushels?



1. This is the plan of a square piece of ground drawn to a scale of $\frac{1}{2}$ an inch to 1 yard.
2. Measure the figure. What is its length? Its width?
3. How many feet long would the lot be? How many feet wide?
4. Count the number of square yards. By what name have we known $16\frac{1}{2}$ feet? By what name have we known $5\frac{1}{2}$ square yards?
5. If the figure were 320 times as long as represented, how long would it be? How wide?
6. What would you call such a square figure?
7. Referring to figure A on page 152, if each square represents 1 square inch, how long would the side of this figure be? How many square inches would it contain?
8. How many square inches in a square foot?
9. How many square feet in a square yard?
10. How many square yards in a square rod?



The above is a plan of a garden drawn to a scale of 12 feet to 1 inch.

1. To find the area of the entire garden, first divide as indicated by the dotted lines.
2. The area of B is equal to how many square feet? How many square yards?
3. Find the area of D in square feet. In square yards. The area of C.
4. Find the area of A in square feet. In square yards.
5. Find the area of the entire garden in square yards.
6. C is what part of A?
   D is what part of C? Of A?
   B is what part of D? Of C? Of A?
7. If 1 inch on the plan represents 4 yards, what is the area of each section in square yards? In square feet?
8. If 1 inch on the plan represents 8 rods, what is the area of each section in square rods?

Sq. in. = square inch. Sq. rd. = square rod.
Sq. ft. = square feet. A. = acre.
Sq. yd. = square yard. Sq. mi. = square mile.

1 sq. ft.	1 sq. yd.	1 sq. rd.	1 A.	1 sq. mi.
144 sq. in.	9 sq. ft.	30¼ sq. yds.	160 sq. rds.	640 A.

1. In 60 A. how many sq. rd.?
2. In 32 sq. rd. how many sq. yd.?
3. In 63 sq. yd. how many sq. ft.?
4. In 37 sq. ft. how many sq. in.?
5. In 56 A. and 13 sq. rd. how many sq. rd.?
6. In 47 sq. rd. and 9 sq. yd. how many sq. yd.?
7. In 37 sq. yd. and 7 sq. ft. how many sq. ft.?
8. In 134 sq. ft. and 47 sq. in. how many sq. in.?

9. Add:

60 A. 15 sq. rd.	16 sq. rd. 4 sq. yd.
137 A. 40 sq. rd.	47 sq. rd. 8 sq. yd.
256 A. 56 sq. rd.	64 sq. rd. 15 sq. yd.
186 A. 49 sq. rd.	32 sq. rd. 3¼ sq. yd.

10. Add:

14 sq. yd. 2 sq. ft.	4 sq. ft. 43 sq. in.
11 sq. yd. 4 sq. ft.	6 sq. ft. 84 sq. in.
4¼ sq. yd. 3 sq. ft.	7 sq. ft. 17 sq. in.

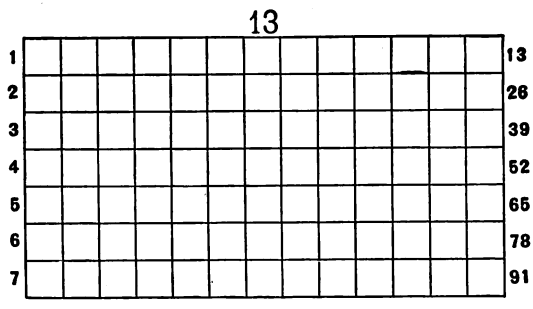
11. Subtract:

18 sq. ft. 56 sq. in.	16 sq. yd. 7 sq. ft.	18 A. 86 sq. rd.
5 sq. ft. 13 sq. in.	11 sq. yd. 3 sq. ft.	5 A. 17 sq. rd.

12. Multiply:

6 sq. ft. 24 sq. in.	6 sq. yd. 3 sq. ft.	3 A. 80 sq. rd.
6	3	2

1. A board is 13 feet and 4 inches long and 12 inches wide. What is the area of 1 side in square feet?
2. A house 24 feet wide covers 72 square yards of ground. How long is it and what is the distance around it?
3. The blackboards in a schoolroom are equal to 1 blackboard 54 feet long and 4½ feet wide. How many square feet of surface in all of the blackboards, and what will it cost to slate them at 36¢ a square yard?
4. How many acres of ground in 4000 square rods?
5. What will a farm 240 rods long and 60 rods wide cost at $35 an acre?
6. A man has 10 acres and 90 square rods. He buys 8 acres and 70 square rods. How much land does he then have?
7. How many square feet in the floor of a room that is 24 feet long and 12½ feet wide? What will it cost to paint the floor at 25¢ a square yard?
8. How many square yards of cloth will it take to cover a table that is 48 inches long and 36 inches wide?
9. The floor of a hall 36 feet long and 6 feet wide is paved with marble blocks 1 foot square. How many blocks did it take to pave the hall?
10. A hall 24 feet long and 6 feet wide is paved with tile 6 inches square. How many tiles were required?
11. A room is 18 feet long, 15 feet wide and 9 feet high. How many square yards in the floor and ceiling. How many square yards in the walls?
12. How many square feet of flooring in a 9 story building which is 55 feet wide and 123 feet long?
13. How many square feet of sidewalk in 9 blocks of 275 feet each, if the sidewalk is 8 feet wide?
14. A building is 150 feet long and 40½ feet wide. How many square yards does it cover?



1. $13 \times 2 =$ _____. $13 \times 5 =$ _____.
   $13 \times 3 =$ _____. $13 \times 6 =$ _____.
   $13 \times 4 =$ _____. $13 \times 7 =$ _____.
2. 13 is what part of 26? Of 39? Of 78? Of 65? Of 52? Of 91?
3. $39 + 13 =$ _____. $78 + 13 =$ _____.
   $26 + 13 =$ _____. $65 + 13 =$ _____.
   $52 + 13 =$ _____. $91 - 13 =$ _____.
4. $\frac{8}{13}$ $\frac{9}{13}$ $\frac{11}{13}$ $\frac{7}{13}$ $\frac{6}{13}$ $\frac{12}{13}$ $\frac{10}{13}$ $\frac{5}{13}$

5. How many stripes in our flag?
6. How many red stripes?
7. How many white ones?
8. When was the number of stars 3 times the number of stripes?
9. When will the number of stars be 4 times the number of stripes?
10. 5 times the number of stripes in our flag is the year of the century in which the Civil War closed. In what year did the war close?
11. From the Declaration of Independence to the World's Fair in Chicago was 9 times as many years as there are stripes in the flag. How long was it?

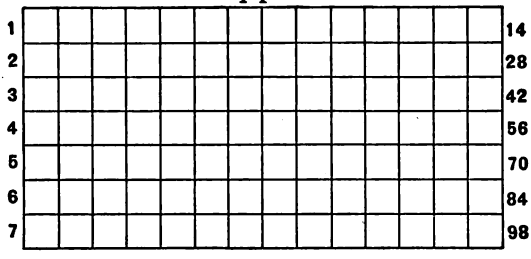
In the following problems, the phrase "at the same rate" or its equivalent is understood and has been omitted to give room for a greater number of problems.

1. 3 pounds of butter cost 75¢. What is the cost of 4 pounds?
2. If 9 barrels of flour cost $45, what is the cost of 7 barrels?
3. 5 acres of land cost $250. What is the cost of 7 acres of land?
4. I received $63 for 9 weeks' work. What should I receive for 12 weeks' work?
5. What is the cost of a dozen chairs if $\frac{1}{4}$ of a dozen cost $12?
6. If I pay 4¢ for 10 marbles, what should I pay for 25 marbles?
7. When eggs sell at 30¢ for 2 dozen, what is the cost of $\frac{1}{3}$ of a dozen?
8. A dozen pairs of boots cost $36. What is the cost of 8 such pairs?
9. When 2 gallons of syrup cost $1.50, what is the cost of 3 quarts?
10. A man receives $1200 a year and spends $45 a month. How much does he save the first 6 months?
11. A piece of string is 6 lengths of an 18-inch rule. How many feet long is it?
12. A man had on his wagon 30 bushels of wheat, $\frac{2}{3}$ of which he sold at 95¢ a bushel. The remainder he sold at 98¢ a bushel. What did he receive for the entire load?
13. The curtains for a room with 3 windows cost $5. What will they cost for a room with 12 windows?
14. 3 dozen neckties cost $1.80. What is the cost of 4 neckties?
15. A car runs 4 miles in 20 minutes. How far will it run in 3 hours?

NOTE — In plastering, many contractors make no deductions for windows or doors on account of the extra time necessary to do the work carefully around the frames. In all the problems, therefore, on plastering, unless otherwise stated, the walls are counted as solid.

1. A room is 9 feet by 21 feet and 9 feet high. How many square yards in the walls? In the ceiling? What will it cost to plaster the walls and ceiling at 21¢ a sq. yd.?
2. A room is 12 feet square and 10 feet high. What will it cost to plaster the walls and ceiling at 23¢ per sq. yd.?
3. What will be the cost of plastering the walls of a room 9 by 12 feet and 9 feet high at 45¢ a square yard?
4. What will be the cost of plastering the ceiling of a room 24 feet square at 28¢ a square yard?
5. Mr. Jones wishes to plaster the walls and ceilings of 3 rooms. The first room is 9 by 12 feet, the second 12 by 15 feet and the third 15 by 18 feet. The height of each room is 9 feet. What will be the cost of plastering the three rooms at 28¢ a square yard?
6. What would be the cost of carpet a yard wide for the three rooms at 75¢ a yard?
7. The floor of a room contains 324 square feet. One side of it is 4 yards long. How many yards long is the other side?
8. The 4 walls of a square room 8 feet high contain 384 square feet. What is the length and the width of the room?
9. The top of a desk is 2 feet and 6 inches wide and 4 feet long. How many square feet does it contain?
10. What is the length of a wall 12 feet high the area of whose side is 3 times 264 square feet?
11. A room is 10 feet wide and $11\frac{1}{2}$ feet long. A rug on the floor is $2\frac{1}{2}$ yards wide and 3 yards long. How much of the floor is not covered by the rug?

14

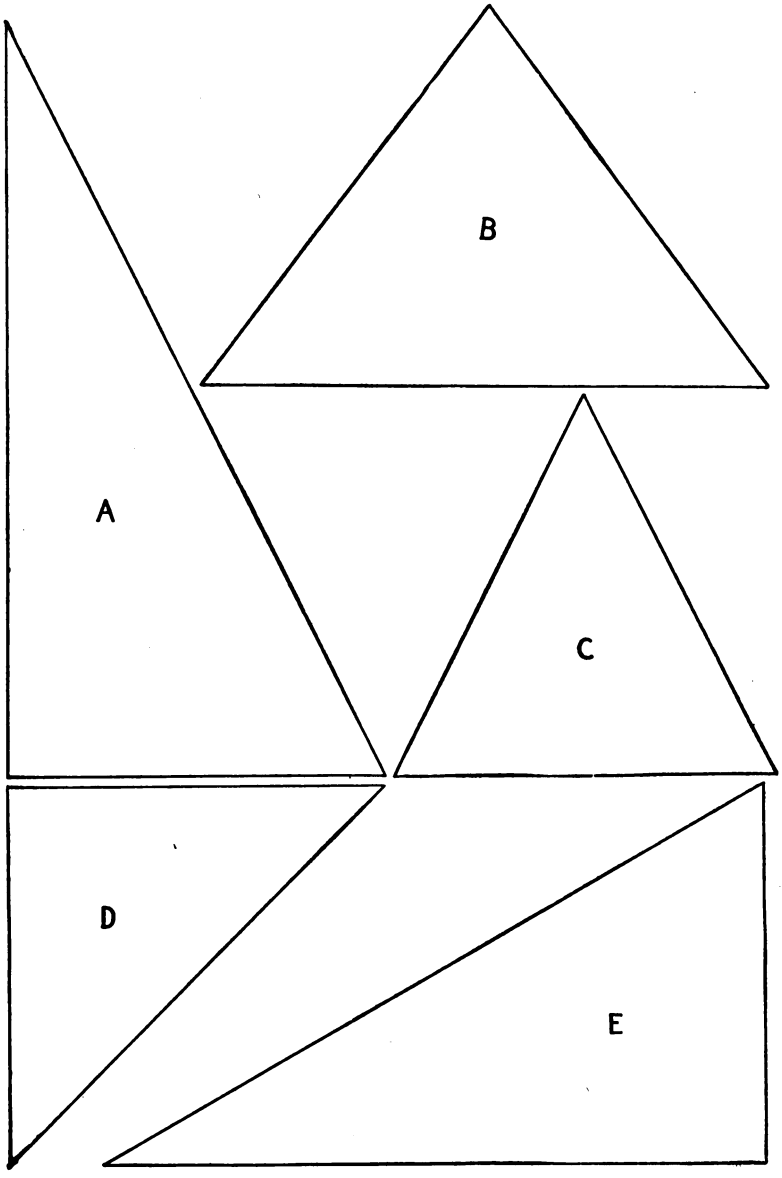


1. Add:

14	14	14	14	14	28
14	14	28	56	28	28
	28	28	14	56	42

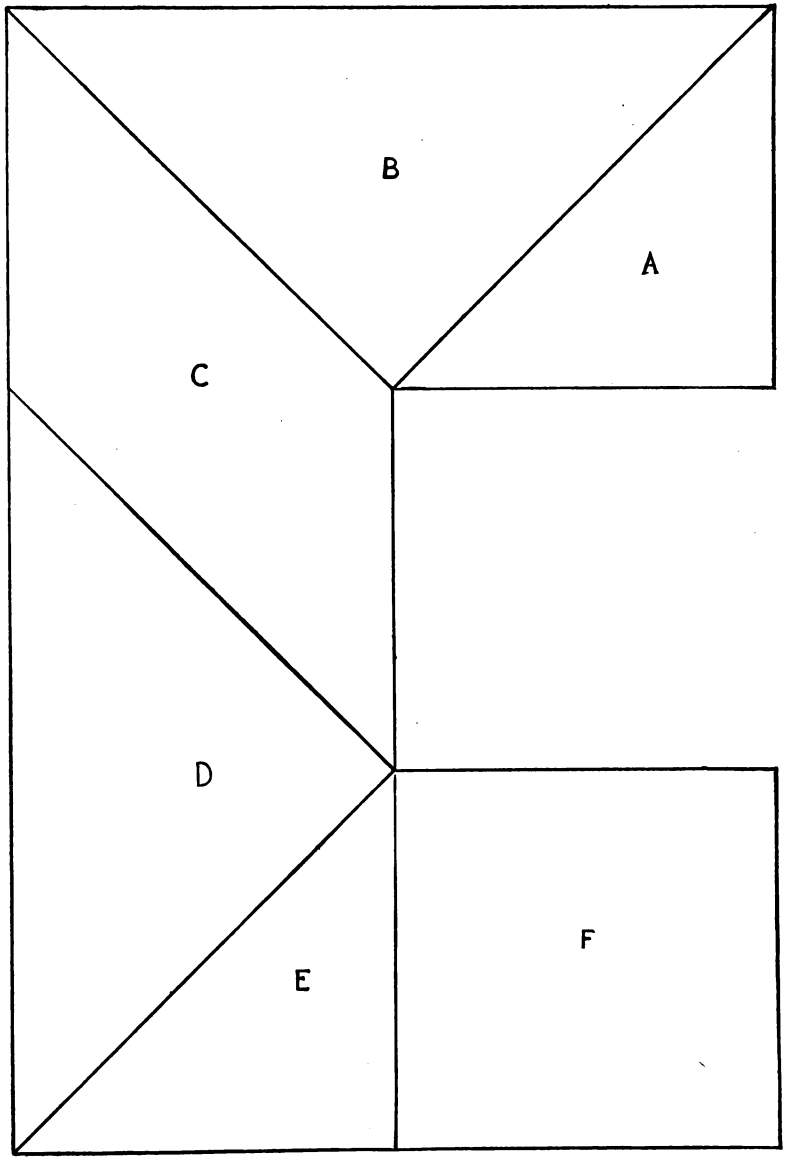
2. $14 \times 3 =$ _____. $14 \times 6 =$ _____. $14)98$
   $14 \times 2 =$ _____. $14 \times 7 =$ _____.
   $14 \times 5 =$ _____. $14 \times 4 =$ _____. $14)70$

3. 14 is what part of 28? Of 56? 42? 70? 84? 98?
4. How many 28's in 42? 70? 84? 56? 98?
5. 42 is how many 14's? 28's? What part of 56? Of 70?
6. 56 is how many 14's? 28's? 42's? What part of 70? 98?
7. 70 is how many 14's? 28's? 42's? 56's? What part of 98?
8. 84 is how many 14's? 28's? 42's? 56's? 70's?
9. A man fed his horse $1\frac{1}{2}$ pecks of oats each day for 4 weeks. How many bushels of oats did he feed him?
10. Mr. Jones traveled 195 mi. each day for 2 weeks. How far did he travel in the two weeks?
11. A train ran 14 miles in 30 minutes. How far would it run at the same rate in $2\frac{1}{2}$ hours?
12. A piece of ground 1008 ft. wide is divided into 14 equal lots. What is the width of each lot?


A
B
C
D
E

1. Review page 121.
2. How long is the base of the triangle A on the opposite page?
3. What is the altitude of the triangle?
4. Into what rectangle can you change the triangle A?
5. What is the area of this rectangle?
6. What, then, is the area of the triangle A?
7. What rule would you give for finding the area of such a triangle?
8. Measure the triangles B, C, D and E, and give the dimensions in each case of the rectangle into which you can change the triangle.
9. What is the area of each of these rectangles?
10. What, then, is the area of the triangle B? Of the triangle C? Of E?
11. If you were to make a rectangle whose width was the base of A, and whose length was the altitude of A, would you change the largest angle of the triangle?
12. Such an angle we call a right angle and every triangle which has such an angle is called a right-angled triangle.
13. What triangles on the opposite page are right-angled triangles?
14. If an inch of the plan represented a yard, what would be the area of each triangle in feet?
15. Find the area of the following right-angled triangles:

    Base three feet, altitude six feet.
    Base four feet, altitude three feet.
    Base six feet, altitude eight feet.
    Base eight feet, altitude ten feet.
    Base twelve feet, altitude eight feet.
    Base fifteen feet, altitude twelve feet.
    Base ten inches, altitude five inches.


B
A
C
D
F
E

NOTE.—The plan on the opposite page represents a garden, which has been cut into various parts by the walks running through it. The plan is drawn to the scale of 10 feet to an inch.

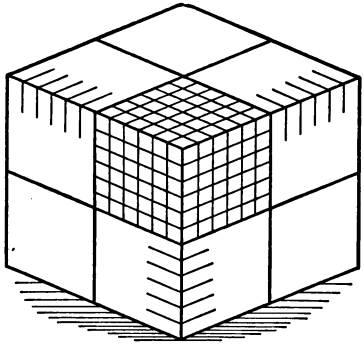
1. Measure the line around the entire plan and find the length of the path around the garden.
2. From these measurements, what is the area of A?
3. What is the area of B?
4. What is the area of C?
5. What is the area of D?
6. What is the area of E?
7. What is the area of F?
8. How many square feet are there in the entire garden?
9. A is what part of B? C? D? E? F?
10. F is what part of the entire garden?
11. How did you find the area of C?
12. How did you find the area of D?
13. In what other ways beside finding the areas of the triangles could you find the area of the entire garden?

NOTE.—Suppose the plan on the opposite page, representing a piece of land, is drawn to a scale of one inch to 8 rods.

14. What will be the value of A at 25¢ a sq. rd.?
15. What will be the value of B at 30¢ a sq. rd.?
16. What will be the value of C at 28¢ a sq. rd.?
17. What will be the value of D at 27¢ a sq. rd.?
18. What will be the value of E at 26¢ a sq. rd.?
19. What will be the value of F at 29¢ a sq. yd.?
20. How many sq. rds. in the entire field?
21. How many acres?
22. How many sq. yds. in A?
23. How many sq. ft. in B?
24. How many sq. yds. in C?
25. How many sq. ft. in D?
26. How many sq. yds. in E?
27. How many sq. ft. in F?

1. A woman who raises chickens puts 13 eggs under each of 6 hens. The first hatched out all but 1, the second all but 2, the third all but 3, the fourth all but 4, and the others all but 5 each. How many chickens were hatched?
2. How many pigeons will it take to pick up a bushel of corn (56 lbs.) if each one picks up 4 oz.?
3. A man buys 12 tons of hay for $80 and sells it for 60¢ per cwt. How much does he make?
4. An expressman receives $3.25 per day for 30 days. It costs him 30¢ per day to feed his horse. He pays $4.20 for repairs to his wagon. How much has he left?
5. An express company carries 400 packages at 15¢ each, 28 trunks at 50¢ each, and 12 bicycles at 40¢ each. What does it get for them all?
6. There are 40 street cars on one line and each can carry 60 people. How many people will they all carry in 12 round trips if $\frac{1}{2}$ carry their full number each way and the remainder carry 30 persons each way?
7. A baker has 400 loaves of bread. He sells $\frac{3}{4}$ at 5¢ per loaf, 60 loaves at 4¢, and gives the rest away. How much does he get for the bread?
8. How many sheep must there be to produce a ton of wool if the wool from each sheep weighs 4 lbs.? If each sheep produces 5 lbs.?
9. How many balls of kite string will it take to reach $1\frac{1}{2}$ miles if each ball contains 200 yards? 300 yds.?
10. A farmer raised 840 bu. of potatoes on 5 acres of land. What was the value of the average produce of 1 acre at 40¢ per bushel?
11. A man set out 12,000 cabbage plants, but $\frac{1}{6}$ of them died and $\frac{1}{10}$ of the remainder were stolen. What did he receive for the rest at $3 per hundred?

1. An orchard of 600 trees produced 3 bbls. of apples to the tree. The owner sold them at $1.40 per bbl., but the barrels cost him 25¢ each. What did he get for the apples after paying for the barrels?
2. A peach orchard produced 210 bu. of peaches. If 1 bu. fills 5 baskets, what is the value of the crop at 20¢ a basket?
3. A farmer pays some boys 1¢ per box for picking berries, and the boxes cost him $\frac{1}{4}$¢ each. If he sells 1000 boxes of berries for $60.00, what is his share of the money?
4. A boy's pay for a week's work at berry-picking at 1¢ per box was $5.40. How many boxes did he pick daily, on an average, during the six days?
5. A farmer sells 1000 boxes of berries to a city grocer at 6¢ per box. It costs the grocer $5.00 to get them to the city and he sells them at 8¢ per box. What is his gain?
6. A woman who kept chickens bought 12 bu. of feed for them at 35¢ per bu. She sold 120 doz. eggs at $12\frac{1}{2}$¢ a doz. and 40 chickens at 25¢ each. What was her gain?
7. How many chickens averaging 5 lbs. each and worth 6¢ per lb. can be bought for $75?
8. If 15 chickens are worth as much as 1 sheep, and 6 sheep are worth as much as 1 cow costing $28.80, what is 1 chicken worth?
9. A carpenter builds a fence for $56. The lumber costs him $15 and he pays each of three men $2.75 per day for four days. What is his share of the $56?
10. A man earns $1.50 every day he works and pays 50¢ a day for his board. If he only works 16 days during the month of May, how much has he left after paying his board?



1. Review pages 69 and 128.
2. How many edges do you see on this block? How many edges has this block?
3. Measure its edges. How long are they? Are all the edges of the block of equal length? What do you call such a block?
4. If you should place 12 of these cubes in a row, how long would the row be?
5. If you should place 12 of these rows side by side, how wide would the whole be?
6. How many cubes would you use?
7. What figure would the upper surface of the cubes form?
8. How many square inches would there be in this surface? How many inch cubes would you use in forming this layer?
9. If you should place another layer of cubes on those already used, how many cubic inches would you have? How many if you used 3 layers? 4 layers? 5 layers? 6 layers? 7 layers? 8? 9? 10? 11? 12?
10. Suppose the picture represents 12 layers of inch cubes, each layer containing 12 rows of 12 cubes each. What would the edges measure? What would you call such a cube? How many cubic inches would it contain?
11. If you should take one-half of this cube and divide into 4 equal cubes, what would each cube measure?
12. What part of the whole cube would each be?
13. How many cubic inches in each part?
14. How many cubic inches in three-eighths of a cubic foot? In seven-eighths? In one-fourth? In three-fourths?

1. A strawberry box is 6 inches long, 4 inches wide and 4 inches deep. How many such boxes can be packed in a case 2 feet long, 1 foot wide and $\frac{2}{3}$ of a foot high?
2. There are 231 cubic inches in 1 gallon. How many gallons can be put into a pail holding 693 cubic inches?
3. How many boxes 12 inches long, 6 inches wide and 3 inches high can be packed in a case 6 feet long, 4 feet wide and 4 feet high?
4. How many cubic feet of air will a glass jar 24 inches long, 18 inches wide and 12 inches high hold?
5. From a vessel holding 2 cubic feet of water 864 cubic inches were taken. How many cubic inches remain? How many cubic feet?
6. In 1 jar there are 864 cubic inches of liquid; in another 2592 cubic inches. How many cubic feet in a third jar, holding as much as the first and second together?
7. A man put 12 inches of sand into a box 9 feet long and 5 feet wide. How many cubic feet of sand in the box?
8. A wagon box 3 feet wide and 9 feet long is $1\frac{1}{3}$ feet deep. How many cubic feet will it hold?
9. A ditch 45 feet long and 2 feet wide contains 630 cubic feet. How deep is the ditch?
10. A freight car is 32 feet long and 6 feet wide inside and is filled with sand $3\frac{3}{4}$ feet deep. How many cubic feet of sand are in the car?
11. A wall is 44 feet long $5\frac{1}{2}$ feet high and 18 inches thick. How many cubic feet in the wall?
12. A sidewalk is 6 inches thick and 6 feet wide. How many cubic feet in 124 feet of the sidewalk?
13. In a building there are 18 pillars 2 feet by 18 inches and 14 feet high. How many cubic feet in these pillars?

Cu. in. = cubic inch cu. ft. = cubic foot cu. yd. = cubic yard

1 cu. ft.	1 cu. yd.	1 cord	1 gal.	1 bu.
1728 cu. in.	27 cu. ft.	128 cu. ft.	231 cu. in.	2150½ cu. in. (nearly)

1. Add:

cu. yds.	cu. ft.	cu. in.
7	6	27
2	10	250
4	2	41
8	3	3
3	4	120

cu. yds.	cu. ft.	cu. in.
6	14	55
2	2	17
3	3	40
1	2	160
8	4	50

cu. yds.	cu. ft.	cu. in.
20	10	75
7	5	50
5	1	64
3	8	125
2	3	800

cu. yds.	cu. ft.	cu. in.
4	7	800
7	6	600
3	4	20
2	2	8
9	7	300

2. Subtract:

cu. yds.	cu. ft.	cu. in.
10	25	1200
6	16	900

cu. yds.	cu. ft.	cu. in.
9	18	350
5	9	275

cu. yds.	cu. ft.	cu. in.
14	20	800
7	13	246

cu. yds.	cu. ft.	cu. in.
11	15	920
6	7	256

3. Multiply:

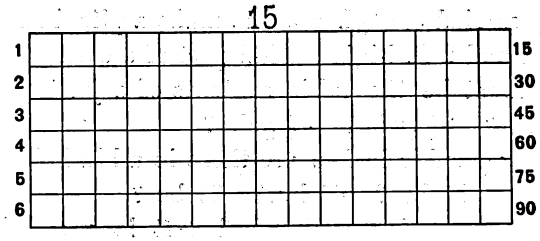
cu. yds.	cu. ft.	cu. in.
6	7	576
		3

cu. yds.	cu. ft.	cu. in.
12	6	432
		4

cu. yds.	cu. ft.	cu. in.
4	13	864
		2

cu. yds.	cu. ft.	cu. in.
4	2	192
		9

1. A boy carried enough wood to make a pile 4 ft. long, 2 ft. wide and 2 ft. high. What part of a cord did he carry?
2. What must be the cubic contents of a jar to hold $\frac{3}{4}$ of a gallon? $2\frac{1}{3}$ gals.? $4\frac{4}{7}$ gals.?
3. How many cubic inches are there in a bin holding 2 bu.? $\frac{1}{2}$ bu.? $5\frac{1}{3}$ bu.? $4\frac{1}{8}$ bu.? $6\frac{1}{4}$ bu.?
4. A cord of wood is usually piled 8 ft. long and 4 ft. wide. How high is it?
5. A bin holds 16 bu. How many cubic inches does it contain?
6. A water trough contains 12 gals. of water. It is 14 in. wide and 9 in. deep. How long is it?
7. How many cu. yds. of earth will be excavated for a cellar that is 24 ft. long, 21 ft. wide and 12 ft. high?
8. From a cellar 36 ft. long and 18 ft. wide 6804 cu. ft. of earth was taken. How deep was the cellar?
9. How many cu. yds. of rock was blasted from a tunnel that is $9\frac{1}{2}$ ft. high, 80 ft. long and $12\frac{1}{2}$ ft. wide?
10. A cubic foot of water weighs 1000 ounces. What will water enough to fill a trough 6 ft. long, 2 ft. wide, and $1\frac{1}{2}$ ft. deep weigh in pounds?
11. If oil weighs $\frac{4}{5}$ as much as water, what is the weight of a cubic foot of oil in pounds?
12. A street sprinkler holds 168 cu. ft. of water. How much does it hold in pounds?
13. If such a street sprinkler is emptied every 24 minutes during 9 hours, how many buckets of water are used if a bucket holds $\frac{1}{3}$ of a cu. ft.?
14. A rectangular tank 6 ft. wide, 10 ft. long, and 3 ft. deep is full of water. What is the weight of the water?
15. 35 cu. ft. of coal will weigh about 2000 pounds. How many tons will a wagon box 7 ft. long, 5 ft. wide, and $\frac{1}{2}$ ft. high weigh if loaded full?



1. Add:

15	15	15	15	15	30
15	30	45	60	30	30
15	15	15	15	45	30

2. $15 \times 2 =$ _____. $15 \times 3 =$ _____. $15)\underline{60}$

   $15 \times 4 =$ _____. $15 \times 6 =$ _____.

   $15 \times 5 =$ _____. $15)\underline{45}$ $15)\underline{90}$

3. 15 is what part of 30? 60? 45? 90? 75?

   30 is how many 15's? What part of 45? 60? 75? 90?

   45 is how many 15's? How many 30's? What part of 60? Of 75? 90?

   60 is how many 15's? How many 30's? 45's? What part of 75? Of 90?

   75 is how many 15's? How many 30's? 45's? 60's? What part of 90?

   90 is how many 15's? How many 30's? 45's? 60's? 75's?

4. A boy bought 3 oranges at the rate of 15¢ a dozen. What did they cost him?

5. A girl bought 12 handkerchiefs at the rate of 2 for 15¢. What did they cost her?

6. Railroad fare for a picnic excursion was 15¢ for the round trip. How much was collected on a train of 9 cars with 65 persons in each car?

1. At a school entertainment there were 186 grown people who paid 15¢ each and 324 children at 10¢ each. The expenses were $15.25. How much was left for the school?
3. A class of 25 pupils have a spelling lesson of 15 words. 15 of them write the lesson once, 6 of them write it twice, and 4 write it three times. How many words do they all write?
3. The pupils of a school put $14.06 into the Penny Savings Bank on Monday and take out $2.40; they put in $7.24 on Wednesday and take out $1.56, and they put in $9.28 and take out $4.10 on Friday. How much more do they put in than they take out for the week?
4. A peddler buys 15 bu. of apples at 90¢ per bushel and sells them at 15¢ per half peck. How much does he make if he sells them all?
5. A banana peddler buys 100 dozen bananas for $7.50. He sells $\frac{1}{4}$ of them at 15¢ per dozen, $\frac{1}{2}$ of them at 10¢ per dozen, 20 dozen at 5¢ per dozen, and the rest spoiled. How much does he make?
6. A junk dealer buys 1000 pounds of old iron for $1.20 and 400 pounds of lead for $6. He sells the iron for $\frac{1}{2}$¢ per pound and the lead for $3\frac{1}{2}$¢ per pound. How much does he make?
7. A milk dealer sells every day 6 cans of milk each holding 8 gallons. How many customers has he if each one takes 2 qts.? If each takes 3 pts.?
8. If he pays 90¢ per can for the milk, and sells it for 5¢ per quart, how much does he gain?
9. A sugar plantation in Cuba produces 480 hhds. of sugar, averaging 540 lbs. in weight. What is the value of the sugar at $2\frac{1}{2}$¢ a pound? At 2¢ a pound, what is the value of the sugar from 15 such plantations?

gi. = gill. qt. = quart. bbl. = barrel.
pt. = pint. gal. = gallon. hhd. = hogshead.

1 pt.	1 qt.	1 gal.	1 bbl.	1 hhd.
4 gi.	2 pts.	4 qts.	31½ gals. (commonly)	2 bbls.

1. Review pages 74 and 130.

2. Add:

gals.	qts.	pts.
4	2	1
3	1	1

gals.	qts.	pts.
7	3	
2		2

bbls.	gals.	qts.
2	14	1
3	6	3

bbls.	gals.	qts.
1	20	1
	11	1

gals.	qts.	pts.
15		1
2	3	

hhd.	bbls.	gals.	qts.
1		16	1
	1	15	1

3. Subtract:

gals.	qts.	pts.
7	4	2
3	3	11

gals.	qts.	pts.
4	2	2
2	1	1

gals.	qts.	pts.
14	6	3
4	4	2

bbls.	gals.	qts.
3	30	2
1	21	

bbls.	gals.	qts.
4	15	3
2		1

hhd.	bbls.	gals.	qts.
2	1	31	2
1		8	1

4. Multiply:

gals.	qts.	pts.
2	3	1
		2

gals.	qts.	pts.
7	1	2
		4

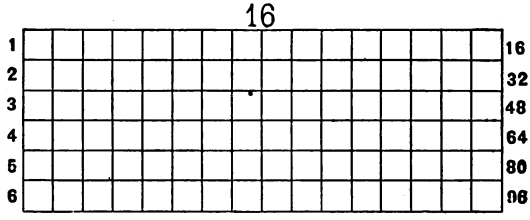
bbls.	gals.	qts.
2	10	2
		3

5. A milkman starts with 42 gals.; sells $\frac{2}{3}$ of the milk to private customers, the rest to a hotel. How many quarts does he sell to the hotel?

6. A druggist put 1 qt. of liquid into bottles holding $\frac{1}{2}$ gi. each. How many bottles did he use?

7. How many jelly glasses holding $\frac{2}{3}$ of a pt. each can be filled from 1 gal. of jelly?

1. How many pint bottles will hold 2 gals. 1 pt. of vinegar? What is it worth at 13¢ a quart?
2. If a gallon of wine cost $4, what will 5 pts. cost?
3. From a milk can holding 8 gals., $\frac{3}{16}$ of the milk was spilled. How many quarts were left? How many gallons?
4. How much ice cream will a man make if he uses a gallon and a half freezer and has it full twice, and half full the third time?
5. How many gals. in 412 gills?
6. What part of 12 gals. is $4\frac{1}{2}$ gals.?
7. A man sold 12 cans of mineral water, each holding 6 gals. at 15¢ per gal. How much did he receive?
8. How many oil barrels, each holding 45 gals., can be filled from a tank holding 10,800 gals. of oil?
9. A hotel uses 25 gals. 3 pts. of milk each day. How much does it use in 3 weeks?
10. There are 231 cu. in. in 1 gal. How many cubic inches in a bottle holding 2 qts.?
11. How many cubic inches in a cistern holding 10 bbls.? 12 bbls.? 16 bbls.?
12. In a jar that holds 2 gals., 3 qts. of water are placed. How many cubic inches of the jar are unfilled?
13. From a barrel of vinegar a grocer fills 2 four-gallon jugs and puts 3 gals. and 1 qt. in another jug. How many gals. had he left?
14. A man sells 3 gals. and 2 qts. of molasses to one customer; 2 gals. and 1 qt. to another customer, and 1 qt. and 1 pt. to a third. How many quarts did he sell in all? How many gallons?
15. From a barrel full of rain water, 80 qts. were taken out at different times. The water remaining in the barrel measured 40 qts., the rest having evaporated. How many quarts had evaporated?



1. Add:

16	16	16	16	16	48
16	32	16	32	32	48
		32	32	48	

2. $16 \times 3 =$ _____. $16 \times 5 =$ _____.
   $16 \times 2 =$ _____. $16 \times 6 =$ _____.
   $16 \times 4 =$ _____.
3. 16 is what part of 32? 48? 64? 80? 96?
4. 32 is how many 16's? What part of 48? Of 64? 80? 96?
5. 48 is how many 16's? How many 32's? What part of 64? Of 80? 96?
6. 64 is how many 16's? How many 32's? 48's? What part of 80? Of 96?
7. 80 is how many 16's? How many 32's? 48's? 64's? What part of 96?
8. 96 is how many 16's? How many 32's? 48's? 64's?
9. A farm of 96 acres was divided into 16 equal parts. How many acres in each?
10. In a square mile of land there are 16 farms equal in size. How many acres in each? If one of these farms is divided into 3 fields, two of which contain 16 acres each, what is the area of the third field?
11. From a bin containing 80 lbs. of meal, 2 eight-lb. packages were taken. How many sixteen-lb. packages can be made from the remainder?

1. A brick mason contracts to build a chimney for $72. If it takes 10 days to do the work and he pays each of his 2 helpers $1.50 per day, what is his rate of pay per day?
2. A man agreed to haul away 1560 cu. yds. of clay for $264. He paid 4 teamsters $3.90 each per day for 13 days. How much did he have left? What did each teamster receive?
3. If each teamster was paid at the rate of 13¢ per cu. yd., how many yds. did he haul to earn what he received?
4. A man hauls sand for 9¢ per cu. yd. If his wagon holds $1\frac{1}{2}$ cu. yds. and he hauls 18 loads per day, what is his daily pay?
5. A newsboy buys his papers at the rate of 10 for 6¢ and sells them for 1¢ each. How much will he gain if he sells 75 papers? 120 papers?
6. He sells 45 on Monday, 54 on Tuesday, 81 on Wednesday, and 70 on Thursday. What does he gain in the 4 days?
7. On Friday he buys 100 papers and sells all but 5 that are spoiled by the rain. What does he receive for his work on Friday?
8. A newspaper prints $1\frac{1}{2}$ million copies in 6 days. At the end of the week 13,326 copies had been given away and 29,674 copies were left on hand. What was the average daily circulation?
9. If $\frac{1}{2}$ of these papers are sold by newsboys, how many newsboys must there be, if each one sells 100 papers every day?
10. A man divides 80 acres of land into streets and building lots. The streets take up $\frac{1}{16}$ of the land, and the remainder is divided into blocks each containing 3 A. How many blocks?

1 qt. = 2 pt. pk. = peck. bu. = bushel.
1 pk. = 8 qt. 1 bu. = 4 pk.

1. Review pages 76 and 131.

2. Add:

3 bu., 1 pk., 6 qt.	1 bu., 2 pk., 3 qt.	2 bu., 3 pk., 4 qt.
1 bu., 2 pk., 1 qt.	2 bu., 1 pk., 5 qt.	3 bu., 4 qt.
4 bu., 2 pk., 5 qt.	5 bu., 2 qt.	3 bu., 3 pk., 7 qt.
1 bu., 2 pk.,	3 pk., 6 qt.	1 qt.

3. Subtract:

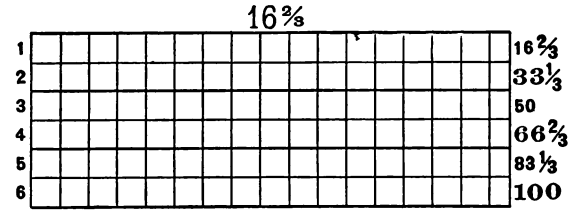
5 bu., 3 pk., 6 qt.	3 bu., 2 pk., 7 qt.	6 bu., 1 pk., 5 qt.
1 bu., 2 pk., 4 qt.	2 bu., 5 qt.	1 bu., 1 pk., 1 qt.
4 bu., 2 pk., 4 qt.	8 bu., 3 pk., 5 qt.	12 bu., 2 pk., 6 qt.
1 pk., 4 qt.	2 bu., 2 pk., 2 qt.	7 bu., 4 qt.

4. Multiply.

2 bu., 2 pk., 3 qt.	3 bu., 1 pk., 3 qt.	4 bu., 1 pk., 1 qt.
2	3	4

5. How many bushels in 128 pks.? In 150 pks.?
6. How many quart boxes will 1 bu. 3 pks. 2 qts. fill?
7. Find cost of 3 pks., 6 qts., 1 pt. of nuts, at 12½¢ a pint?
8. In 96 qts. how many pecks? How many bushels?
9. What part of 7 bu. are 7 pks.? 7 qts.?
10. How many quarts of cherries can be bought for $2, if 1 bushel of cherries is worth $3.20?
11. I bought 7 bu. 3 pks. of potatoes on Monday; 8 bu. on Tuesday and 10 bu. 1 pk. 6 qts. on Wednesday. How many potatoes did I buy in all?
12. A teamster feeds his horses 36 qts. of oats a day. How long will 120 bu. of oats last him? What does it cost him each day when oats are worth 27¢ a bu.?

1. From a sack of peanuts holding 3 bu., 25 qts. were taken. How many bushels remained?
2. A bushel of plums is divided equally among 12 people. How many quarts did each receive?
3. How many pecks of beans will a man sell who sells 3 qts. to each of 8 customers?
4. A woman measuring out $2\frac{1}{2}$ qts. of flour uses a measure holding $\frac{1}{2}$ pt. How many times does she fill the measure?
5. A barrel of apples was sold in 3 lots. The first sale was 1 bu. and 2 pks.; the second 2 pecks; the third $1\frac{1}{2}$ bu. How many bushels were there in the barrel?
6. From 3 bushels of peas, a man sells $\frac{1}{2}$ peck to one customer; 4 qts. to another, 1 pk to another. How many has he left?
7. If one-half a peck of peaches when canned make 3 qts., how many bushels must be bought to make 36 qts. of canned peaches?
8. A man bought at a feed store 5 bu. of corn, 2 bu. and 3 pks. of oats and $1\frac{1}{2}$ bu. of mixed feed. He had at home in the bins, 3 pks. of corn, $\frac{1}{2}$ bu. of oats and 1 pk. of ground feed. How many bushels of feed did he have in the bins after he received what he bought?
9. In one year a farmer's family used $50\frac{1}{4}$ bu. of potatoes. He saved 9 bu. 3 pks. for planting and sold 117 bu. and $3\frac{1}{2}$ pks. How many bushels did he raise that year?
10. 240 boxes of peaches, holding 1 pk. each, were shipped to market. The fruit was picked in one-half bu. baskets. How many baskets of fruit were there?
11. A fruit dealer bought 2 crates of strawberries, each holding 24 qts.; and 6 crates, each holding 32 qts. The berries were put into pint boxes and sold for 10¢ a box. What did the dealer receive for the berries?



1. Add:

$16\frac{2}{3}$	$16\frac{2}{3}$	$16\frac{2}{3}$	$33\frac{1}{3}$	$66\frac{2}{3}$	$83\frac{1}{3}$
$16\frac{2}{3}$	$33\frac{1}{3}$	50	$33\frac{1}{3}$	$16\frac{2}{3}$	$16\frac{2}{3}$

2. $16\frac{2}{3} \times 3 =$ _____. $16\frac{2}{3} \times 6 =$ _____.
   $16\frac{2}{3} \times 2 =$ _____. $16\frac{2}{3} \times 6 =$ _____.
   $16\frac{2}{3} \times 4 =$ _____.
3. $16\frac{2}{3}$ is what part of 50? $66\frac{2}{3}$? $33\frac{1}{3}$? $83\frac{1}{3}$?
4. $33\frac{1}{3}$ is what part of 50? $66\frac{2}{3}$? $83\frac{1}{3}$? 100?
5. 50 is how many $16\frac{2}{3}$'s? $33\frac{1}{3}$'s? What part of $66\frac{2}{3}$? $83\frac{1}{3}$? 100?
6. $66\frac{2}{3}$ are how many $16\frac{2}{3}$'s? $33\frac{1}{3}$'s? 50's?
7. $83\frac{1}{3}$ are how many $16\frac{2}{3}$'s? $33\frac{1}{3}$'s? 50's? $66\frac{2}{3}$'s?
8. 100 is how many $16\frac{2}{3}$'s? $33\frac{1}{3}$'s? 50's? $66\frac{2}{3}$'s? $83\frac{1}{3}$'s?
9. A man paid $16\frac{2}{3}$ of a dollar each for 15 books. What did they cost him?
10. A boy $33\frac{1}{3}$ miles from home, rode $\frac{1}{2}$ the distance on his wheel. How many miles did he ride?
11. A piece of cloth 3 yds. long sold for 50¢ What was the price per yd.?
12. A girl picked $66\frac{2}{3}$ qts. of berries in 4 days. What was the average amount per day?
13. A hundredweight of grain was divided into 6 equal amounts. How many pounds in each?
14. From a tank of water, $16\frac{2}{3}$ gals. were drawn out, which were $\frac{1}{6}$ of the amount remaining. How many gallons were left in the tank?

1. A schooner brought 48,972 spruce trees from northern Michigan to Chicago at Christmas time. What are they worth at 90¢ a dozen?
2. A blacksmith shoes 42 horses at $2 each in 1 week. The shoes and nails cost him $8, shop rent $12, and he pays each of his two helpers $15 per week. What was his share of the money received?
3. A teamster has his two horses shod all around, twice each month, during December, January and February, and once a month the remainder of the year. What does it cost a year at $2 per shoeing for each horse?
4. A cooper made 1000 butter tubs at 12¢ each and 600 barrels at 30¢ each. If he paid $\frac{1}{6}$ of the price for lumber and $\frac{1}{2}$ of it to his workmen, how much did he have left?
5. If each tub holds 24 pounds, what will 1000 tubs of butter be worth at 21¢ per pound?
6. If each bbl. holds 3 bu. of apples, what will 600 bbls. bring if sold at 30¢ per peck?
7. There are 630 sq. yds. of lathing needed in a new house and it can be done in 6 days. Will a man earn more by doing it by the day at $3 per day or by the square yard at 3¢ per sq. yd.?
8. If 54 laths will cover 4 sq. yds. how many will be needed for 600 sq. yds.? How many bundles of 50 laths each?
9. If each lath uses 6 nails, and 54 laths cover 4 sq. yds., how many nails will 600 sq. yds. use? How many pounds allowing 400 nails to the pound?
10. A carpenter works $5\frac{1}{2}$ days in a week at $3 per day, but breaks a saw worth $1.40 and loses a hammer worth 90¢. What is the week's work worth to him?
11. A painter has 3 helpers at $3.50 per day and 2 at $3. What must he charge for a week's work so as to have $25 for himself?

1. Review pages 162 and 163.
2. What is the name of the first period?
3. What is the name of the second period?
4. How many places are there in units' period?
5. Each period has three places.

Thousands.				Units.		
Hundreds.	Tens.	Ones.		Hundreds.	Tens.	Ones.
2	4	6	,	1	2	3

6. Read the figures of each period as though they stood alone and then add the name of the period.

246 thousands.
123 units, or ones.

7. If we multiply the number 246,123 by 10 we will have the beginning of a new period, 2,461,230.
8. This will be read:

2 millions (this is the name of the new period).
461 thousands
230

9. The use of figures to represent numbers, as we have been doing, is called the Arabic Notation or method of writing numbers.
10. There is another method of writing numbers, in which letters are used. This is the Roman Notation.
11. Fill out the following blanks with figures:

I = _____.	VI = _____.	XI = _____.
II = _____.	VII = _____.	L = _____.
III = _____.	VIII = _____.	C = _____.
IV = _____.	IX = _____.	XL = _____.
V = _____.	X = _____.	XC = _____.

12. What is the equivalent in figures of I? V? X? L? C? D? M?

1. If a letter is followed by one or more letters of equal or less value, the sum of all is the value of the number represented. Thus: VI = 6; XI = 11; XX = 20; CLX = 160; DC = 600.
2. If a letter is followed by another of greater value, the difference of the two is the value of the number represented. Thus: IV = 4; IX = 9; XIX = 19; XL = 40; CD = 400.
3. Read the following numbers written in the Roman Notation:

IV	VIII	II	IX
XIX	XVI	XIV	XXXIX
XXXIV	XLIV	XXVII	XI
XLIX	LIV	LXIX	LXXVIII
XCIX	CIX	CLXIX	LC
CCCXXVI	MCLXXIV	DIX	MLV

4. Write the following numbers in the Roman Notation:

9 = _____.	13 = _____.	96 = _____.
4 = _____.	78 = _____.	104 = _____.
7 = _____.	44 = _____.	199 = _____.
6 = _____.	83 = _____.	335 = _____.
14 = _____.	59 = _____.	549 = _____.
29 = _____.	94 = _____.	2000 = _____.

(Write answers to the following in Roman numerals.)

5. Columbus discovered America in MCDXCII; 20 years later Florida was explored. In what year was Florida explored?
6. The first battle of the Revolution was fought in MDCCLXXV; the last battle was fought 6 years later. What was the year of the last battle?
7. Washington was elected President in MDCCLXXXIX; Lincoln was elected 62 years afterward. In what year was Lincoln elected?

Add the following:

(1)	(2)	(3)	(4)	(5)	(6)
7843	32765	25987	96875	81818	247
8789	89247	6586	40984	92193	91838
9576	76348	78379	50839	87689	9705
2589	20873	96468	9787	76434	87278
8956	94608	980	67898	68979	3849
3210	13495	20876	76580	37590	89878
7029	68950	67099	54777	89763	79929
47992					
3 3 4					

In each column the number to be carried may be indicated by placing the figure immediately underneath the column, as in problem 1.

To prove your work, add the columns from the top, downward.

(7)	(8)	(9)	(10)	(11)	(12)
68	238	3271	17284	24567	237
97	472	4089	35873	89012	48984
89	836	3765	89656	4567	3789
43	980	2188	25784	89876	54976
30	722	3900	92375	54378	500
78——405	146	4895	71084	98989	3897
83	348	6589	25874	24864	57878
29	765	8077	39058	3099	36498
48	897	9384	87643	87655	9889
67	305	6589	97979	98788	65847
98	969	9283	86786	4890	678
88——413	878	5670	78978	86767	88796
39	438	8023	27605	67987	3480
64	765	9387	43991	4389	27938
89	735	4738	37642	97689	988
95	897	3777	49877	9480	77658
47——407	642	4738	79988	84976	7865
1225 1225					
11 1					

Another method of proof is to divide the columns into shorter columns, add separately, as indicated in number 7, and add these separate sums.

1. 6384 The larger number is called the *Minuend.*
   1945 The smaller number is called the *Subtrahend.*
   4889 The result is the *Difference* or *Remainder.*
   6834 The addition of the difference and the subtrahend should give the minuend and is the *Proof.*

2. Subtract the following:

(1)	(2)	(3)	(4)	(5)	(6)
8346	24890	36745	48234	57855	72180
5838	17901	17829	29018	29666	23092
(7)	(8)	(9)	(10)	(11)	(12)
62387	83475	90281	38297	27666	87726
34299	56077	37345	19088	18785	68640
(13)	(14)	(15)	(16)	(17)	(18)
418967	687240	723485	868240	927200	707241
229875	478119	438907	372906	418117	354438
(19)	(20)	(21)	(22)	(23)	(24)
381487	592173	600840	821380	727248	917288
191598	394205	236450	291653	570649	129399

3. A man began business with $5,275.75; in five years he had $22,794.50. How much had he gained?
4. One country road is 20 mi. 160 rds. long; another is 14 mi. 80 rds. long; how much longer is the first?
5. A cotton dealer bought 328,900 lbs. of cotton one year, and 715,600 lbs. the next. How many more lbs. did he buy the second year?
6. One vessel is valued at $1,250,000; another at $975,800. What is the difference in value?
7. A box containing 43,200 cu. in. was divided into two parts; one holding 25,920 cu. in. How many cu. in. in the second part?

1. Review pages 95 and 173.

2. Multiply 892 by 235.

$$892 \times 235 = \begin{cases} 892 \times 5 \\ 892 \times 3 \text{ tens} \\ 892 \times 2 \text{ hundreds} \end{cases}$$

892 The number multiplied is the *Multiplicand.*
235 The number multiplied by is the *Multiplier.*

4460	892×5
2676	892×3 tens
1784	892×2 hundreds
209620	The result of multiplying is the *Product.*

It will be noticed that the first right hand figure of each partial product is placed directly beneath the figure by which we are multiplying. Thus, when multiplying by 3, the first figure of the partial product, 6, is placed beneath and in a line with the 3; and when multiplying by 2, the 4 of the partial product is placed directly beneath the 2.

3. Multiply 729 by 460.

$$729 \times 460 = \begin{cases} 729 \times 60 \\ 729 \times 4 \text{ hundreds} \end{cases}$$

729
460

43740	729×60
2916	729×4 hundreds
335340	

4. Multiply 476 by 308.

$$476 \times 308 = \begin{cases} 476 \times 8 \\ 476 \times 3 \text{ hundreds} \end{cases}$$

476
308

3808	476×8
1428	476×3 hundreds
146608	

1. Find the following products:

573 × 248	384 × 537	735 × 376	487 × 789
858 × 305	275 × 937	972 × 219	976 × 253
835 × 583	508 × 607	506 × 429	4005 × 129
968 × 675	651 × 234	309 × 150	2060 × 456
809 × 584	943 × 923	847 × 907	3070 × 250
548 × 394	475 × 406	653 × 295	1022 × 284

2. An elevator in a tall building goes up 165 ft. and down the same distance each trip. How many feet does it go in 152 trips?
3. If it cost 56¢ per word for a cablegram from Japan to Chicago, what is the cost of a message of 1213 words?
4. If a steamer burns 378 pounds of coal in going 1 knot, how many pounds will she burn in going 15,288 knots?
5. There are 40 street lamps on 1 mile of street, each burning 18 cu. ft. of gas every night. How much gas will they burn in the month of April?
6. A library has in one case 276 books, which contain, on an average, 304 pages each. How many pages of reading matter in the bookcase?
7. There are 897 hills of corn in a single row and 364 such rows in a field. How many hills of corn in the entire field?
8. There are 43,560 square ft. in an acre. If 189 pounds of water fall on one square ft. in a year, how many pounds will fall on an acre?
9. There are 12 elevators in a building. They each make 94 round trips in a day and carry, on an average, 4 passengers each way. How many passengers make single trips on all of them in a day?
10. In a single layer in a wall there are 964 bricks. The wall is 197 bricks high. How many bricks does it contain?

1. Divide 20, 30, 40, 60, 90, 70, 80, each by 10. In each case what do you do when dividing by 10?
   Divide 250, 520, 750, 640, 980, 370, each by 10.
2. Divide 400, 900, 800, 500, 300, each by 100. In each case what do you do when dividing by 100?
   Divide 7500, 8900, 2400, 6400, 3700, each by 100.
3. Divide 7000, 9000, 2000, 8000, each by 1000. In each case what do you do when dividing by 1000?
   Divide 75000, 26000, 367000, 845000, each by 1000.
4. Divide 860 by 20.
   The number to be divided (860) is called the *Dividend.*
   The number to be divided by (20) is called the *Divisor.*
   The result of the division (43 below) is the *Quotient.*

$$20 = 10 \times 2. \quad \text{Then } 860 \div 20 = \left\{ \begin{array}{r} 10)860 \\ \overline{2)86} \\ \overline{43} \end{array} \right\} = \overline{2\text{Ø})86\text{Ø}} \\ 43$$

When the dividend and divisor both end in a cipher, the cipher may be canceled as above and the division made as indicated without the ciphers.

5. Divide 9200 by 400.

$$\overline{4\text{ØØ})92\text{ØØ}} \\ 23$$

When the dividend and the divisor end in two or more ciphers, an equal number of ciphers may be canceled from each as above, and the division made as indicated without the ciphers.

6. Divide:

480 ÷ 30	3600 ÷ 1200	16000 ÷ 2000
720 ÷ 40	2700 ÷ 900	21000 ÷ 7000
540 ÷ 60	6300 ÷ 700	60000 ÷ 12000
270 ÷ 90	13200 ÷ 1100	25000 ÷ 5000
650 ÷ 50	8400 ÷ 400	24000 ÷ 3000
490 ÷ 70	5000 ÷ 1000	54000 ÷ 9000
720 ÷ 80	9300 ÷ 300	36000 ÷ 4000
780 ÷ 20	6400 ÷ 800	96000 ÷ 8000

1. Divide 21,816 by 72.

$$72\overline{)21816}\quad 303$$

216

216

216

2. Divide 15,250 by 61.

$$61\overline{)15250}\quad 250$$

122

305

305

0

3. Divide 5130 by 342.

$$342\overline{)5130}\quad 15$$

342

1710

1710

4. Divide 25,215 by 105.

$$105\overline{)25215}\quad 240\tfrac{15}{105}$$

210

421

420

15 rem.

Proof:

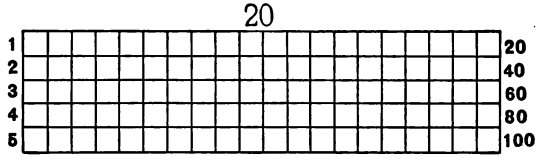
105 divisor.
240 quotient.
4200
210
25200
15 rem.
25,215 dividend.

To prove the correctness of division, multiply the divisor by the quotient, and add the remainder if there be one. The result should equal the dividend.

5. Divide:

3767 ÷ 38	99,684 ÷ 234
7873 ÷ 41	91,464 ÷ 111
7692 ÷ 32	94,770 ÷ 135
67,654 ÷ 53	95,928 ÷ 806
26,754 ÷ 64	90,750 ÷ 125
95,637 ÷ 75	68,331 ÷ 911
76,894 ÷ 86	33,633 ÷ 111

1. A lumber vessel carried 887,392 barrel staves. Allowing 16 staves to the barrel, how many barrels can be made from them?
2. A ship traveled about 15,238 nautical miles in 66 days, stopping 12 days on the way for coal and other supplies. What was her average speed per hour?
3. The Danube River is 1,725 miles long, the Rhine 600 miles and the Rhone 580 miles. How many times as long as the Thames, 220 miles, is their united length?
4. There are 102 counties in Illinois and the area of the state is 56,650 square miles. What is the average size of each county?
5. Chicago's area is 119,689 acres. How many square miles of land in Chicago?
6. A field of corn has in it 229,599 hills. There are 291 equal rows. How many hills in each row?
7. A rectangular farm contains 552,866 square yards. One end of it is 563 yards long. How long is one side?
8. A field contains 926,156 square feet. One end of it is 679 feet long. How long is one side?
9. At a brick yard 3,276,224 bricks were made during the season. They were hauled away in 824 equal loads. How many bricks were hauled at a load?
10. $48,077.29 was divided equally among 709 men. How much did each receive?
11. A merchant sold 999 bicycles for $41,793.72. What was the average selling price of each bicycle?
12. In 312 days of the year a merchant sold $91,040 worth of goods. What did his daily sales average?
13. In four years a factory uses 1,434,160 pounds of coal. What was the average amount used per week?
14. The Atlantic Ocean in the deepest part is 27,366 feet deep. What is its depth in miles?



1. How many 20's in 40? In 80? 60? 100?
2. 40 is how many 20's? What part of 60? Of 80? 100?
3. 60 is how many 20's? 40's? What part of 80? 100?
4. 80 is how many 20's? 40's? 60's? What part of 100?
5. 100 is how many 20's? 40's? 60's? 80's?
6. A boy bought 80 papers for 44¢. The next day he bought 20 papers at the same rate. What did they cost him?
7. A train goes 40 miles in 55 minutes. At the same rate how long will it take to go 80 miles?
8. A boy rode 9 miles in 1 hour. How far will he ride at the same rate in 40 minutes?
9. 60 qts. of syrup cost $7.20. At the same rate what will 5 gal. cost?
10. A man puts 20 pounds of meal in one sack. How many sacks will he need for 1 hundredweight?
11. $\frac{1}{3}$ of a bu. of wheat weighs 20 pounds. How many bu. weigh 60 pounds? 80 pounds? 100 pounds?
12. A toy bank holds $2 in dimes. How many weeks will it take to fill it if 20¢ are put in each week?
13. Allowing 4 weeks to the month, how many terms of 20 weeks are there in 10 months of school? How many terms does a boy spend in school who attends 25 school months?
14. It takes a man 20 minutes to reach his office. What part of an hour does it take him each day to go and return? How many hours does it take him in 6 days?
15. A man bought 40 horses for $2880. At the same rate what will be the cost of 100 horses?

oz. = ounce. lb. = pound. cwt. = hundredweight. T. = ton.

1 lb.	1 cwt.	1 T.
16 oz.	100 lbs.	20 cwt.

1. How many ounces in 8 lbs.? In 14 lbs.? In 20 lbs.? In 25 lbs.?
2. How many pounds in $3\frac{1}{2}$ cwt.? In $7\frac{1}{5}$ cwt.? In $9\frac{1}{4}$ cwt.?
3. How many pounds in 1 T.? In 4 T.? In $3\frac{1}{4}$ T.?
4. How many ounces in $\frac{1}{2}$ cwt.? In $2\frac{1}{4}$ cwt.? In $3\frac{2}{5}$ cwt.?
5. How many ounces in $\frac{1}{2}$ T.? In $3\frac{1}{8}$ T.? In $2\frac{1}{8}$ T.?
6. How many hundredweights in $\frac{1}{2}$ T. and in $\frac{1}{4}$ T. together?
7. 1 T. equals 10 cwt. and how many pounds?
8. Add:

2 T.	17 cwt.	25 lbs.
1	2	75

1 T.	8 cwt.	60 lbs.
4	1	40

10 cwt.	25 lbs.	8 oz.
5	30	6
4	44	2

9 cwt.	20 lbs.	4 oz.
4	9	9
6	18	2

9. Subtract:

3 T.	15 cwt.	14 lbs.
2	7	8

2 T.	12 cwt.	9 lbs.
1	8	6

15 cwt.	75 lbs.	8 oz.
8	35	5

16 cwt.	43 lbs.	12 oz.
14	23	8

10. Multiply:

3 T.	5 cwt.	15 lbs.
		4

2 T.	3 cwt.	20 lbs.
		5

2 cwt.	9 lbs.	2 oz.
		8

4 cwt.	3 lbs.	4 oz.
		4

11. Divide:

2)4 T. 18 cwt. 50 lbs.

3)6 T. 15 cwt. 48 lbs.

1. At 10¢ an oz. how much will $3\frac{1}{2}$ lbs. of cinnamon cost? $4\frac{1}{4}$ lbs?
2. What will a ton of hay cost at $\frac{1}{2}$¢ a pound?
3. A bushel of wheat weighs 60 lbs. How many bushels in a load of wheat weighing 1 T., 6 cwt. and 40 lbs.?
4. A family uses 75 lbs. of ice every day for 20 days. What does it cost them at 35¢ per cwt.?
5. From 10 cwt. of sugar a grocer sold 8 cwt., 40 lbs., 12 oz. How much was left?
6. 60 lbs., 10 oz. of tea were divided equally among 5 persons. How much did each receive?
7. A man bought 3 lbs., 8 oz. of meat at 16¢ a lb. and 2 lbs., 12 oz. of butter at 20¢ a lb. What was the total cost?
8. A bushel of oats weighs 32 lbs. How many bushels in 80 cwt.?
9. From a keg of nails weighing 1 cwt., 15 lbs. and 8 oz. were taken at one time, 9 lbs. and 12 oz. at another. What was the weight of the remainder?
10. How many bales of cotton, each weighing 450 lbs. may be shipped on a vessel which can carry 2250 tons? On a vessel that can carry 3000 tons?
11. What will it cost to have 8 tons of coal hauled at 75¢ a load of 3500 lbs.?
12. 500 bbls. of flour are shipped in 7 equal loads. How many tons will each load weigh if 1 bbl. weighs 196 lbs.?
13. A man hauled 8 loads of wheat, 35 bu. at a load. A bushel of wheat weighs 60 lbs. What was the weight of the 8 loads? How many hundredweight in each load?
14. A farmer owning 700 bu. of oats sold 9 loads of 2240 lbs. each. One bushel weighs 32 lbs. How many bushels had he left?

sec. = second. hr. = hour. wk. = week.
min. = minute. d. = day. mo. = month. yr. = year.

1 min.	1 hr.	1 d.	1 wk.	1 yr.
60 sec.	60 min.	24 hr.	7 d.	12 mo.
				52 wks. 1 d.
				365 d.

1. Review page 157.
2. How many months in $\frac{1}{2}$ a yr.? In $3\frac{1}{4}$ yrs.? In $5\frac{1}{6}$ yrs.?
3. How many minutes in 3 hrs? In $2\frac{1}{3}$ hrs.? In $1\frac{1}{4}$ hrs.? In $\frac{3}{4}$ of an hr.? In one day?
4. In 4 yrs. how many days? In $2\frac{1}{5}$ yrs.? In $\frac{4}{5}$ of a yr.?
5. How many seconds in 5 min.? In one hr.? In $\frac{1}{2}$ an hr.? In $\frac{1}{2}$ a day?
6. Add:

8 hrs., 30 min., 15 sec.	3 mo., 1 wk., 7 d.
3 29 45	8 3 12
1 yr., 8 mo., 15 d.	**2 yrs., 6 mo., 10 d.**
3 2 5	2 4 15

7. Subtract:

24 hrs., 50 min., 30 sec.	4 yrs., 8 mo., 15 d.
8 30 15	1 2 6
6 yrs., 4 mo., 20 d.	**5 yrs., 9 mo., 6 d.**
3 3 12	4 8 5

8. Multiply:

4 hrs., 15 min., 30 sec.	3 hrs., 15 min., 20 sec.
× 2	× 3
4 yrs., 2 mo., 4 d.	**5 yrs. 2 mo., 3 d.**
× 5	× 6

1. Divide:

3)6 hrs., 45 min., 15 sec.

6)24 hrs., 30 min., 18 sec.

2)4 yrs., 8 mo., 12 d.

5)5 yrs., 10 mo., 15 d.

2. Find the time between June 6, 1885, to Aug. 12, 1889.

The difference between dates is found by subtraction, using the numbers of the months named.

	yr.	mo.	d.
Aug. 12, 1889 =	1889	8	12
June 6, 1885 =	1885	6	6
	4	2	6

3. Find the time from:

Jan. 2, 1865, to June 5, 1887.
Mar. 12, 1885, to May 21, 1889.
July 21, 1872, to Sept. 26, 1890.
Feb. 15, 1860, to Oct. 29, 1878.
Nov. 2, 1889, to Dec. 28, 1892.
Apr. 10, 1879, to Aug. 25, 1897.

4. If a boy works $\frac{1}{3}$ of each day for 6 days at 20¢ an hr., what is his week's salary? If he works 9 hrs. overtime, half of that time at 15¢ a half hour and the rest at 20¢ a half hour, what is his pay for the extra work?
5. A man leaves his office for home at 5.45 p. m., and arrives 45 min. later. What time does he reach home? If he takes the same time going and returning every day, how many hours does he thus spend in ten days?
6. A fast mail train runs from Chicago to Burlington in 5 hrs. 20 min. 45 sec. and a freight train runs the same distance in 9 hrs. 40 min. How much longer does it take the freight train?
7. James was born September 18, 1887, and Willie was born December 21, 1892. How much older is James?

1. There are 319 pages in a book, how many pages are there in 369 such books?
2. There are 18 windows on each side of a car. How many windows are there in 397 cars?
3. In a 7 story building, there are on each of the sides, 27 windows on each story; there are on each of the ends 16 windows on each story. How many windows in all?
4. A street paved with stone blocks contains 65 stones in width and 786 in length. One man must buy half of these. If they cost him 7¢ each, how much must he pay for them?
5. How many grains will 1,648 silver dollars weigh, if one dollar weighs 412½ grains?
6. A man deposits $372 in the bank each week day for 26 weeks. How much does he deposit in that time?
7. A man rides 116 miles a day on his bicycle. How far from the city can he go and return in 12 days?
8. It is 195 feet between the telegraph poles. How much wire is needed to put up 6 wires on 257 poles?
9. A merchant bought 97 rolls of carpet, 27 of them containing 56 yards to the roll, 34 containing 59 yards to the roll, and the remainder 63 yards to the roll. How many yards did he buy?
10. A manufacturer sold 65 cases of shoes, each case containing 6 dozen pairs, at $2.75 a pair. What was the amount of his sale?
11. A farmer had 2,365 bushels of wheat. He sold 1,240 bushels at 65¢ a bushel, 643 bushels at 85¢ a bushel, and the remainder at 96¢ a bushel. How much did he get for the entire crop of wheat?
12. A merchant's sales were $127 each day for 23 days, $156 each day for 19 days, and $113 each day for 32 days. How much were his sales for the entire time?

1. It is 85 miles from Chicago to Milwaukee. A man went from Chicago to Milwaukee and returned each day for 26 days. How many miles did he travel?
2. A man lived 27 miles from Chicago. He came into the city and returned 6 days each week for 14 weeks. How many miles did he travel?
3. A manufacturer sold 687 bicycles at $47 each. How much did he get for them?
4. An agent sold 163 reapers at $145 each. What was the amount of his sale?
5. The cost of one car is $965. A railroad company buys 235 such cars. What is the cost of the cars?
6. A square building is 115 feet high and 122 feet wide. What is the area of one of its sides in square feet?
7. The same building is covered with a flat roof. How many square feet in the roof?
8. 53 cars stand in a solid blockade on the street. 26 of them are 32 feet long and the remainder 37 feet long. How far is it from one end of the blockade to the other?
9. A street car company sold 540 horses at $62.25 each. How much did it get for the horses?
10. A man works $8\frac{1}{2}$ hours a day, 6 days in the week, for 26 weeks. How many minutes does he work?
11. For every 25 papers a boy delivered he received 13¢. If he delivered at this rate 175 papers a day each week day for 2 weeks, how much money did he get?
12. The school year contained 40 weeks. Each week I burned a quart of oil, which cost me 13¢ a gallon. What did my oil cost me for the school year?
13. An elevator boy received $13 a month as wages. At the end of the year he had spent $19 for clothing, $32 for car fare, $4.50 for books and had given his mother $48. How much money did he have left?

1. Review page 80.
2. A man had in his pocket one five-dollar bill, two two-dollar bills, three one-dollar bills, two half dollars, three quarters, four dimes, six nickels and three pennies. How can he make even change for any one of the following purchases:
3. A hat at $2.65 and a necktie at 50¢?
4. A vest at $3.50 and a dozen collars at 95¢?
5. One book at $1.25 and another at 38¢?
6. A box of paper at 50¢, and inkstand at 65¢ and a fountain pen at $1.95?
7. A pair of shoes at $2.95?
8. Railroad fare at $4.42?
9. Hotel bill for $2\frac{1}{2}$ days at $2.50 a day?
10. A magazine, 35¢; a newspaper, 2¢, and a sheet of paper, envelope and stamp, 5¢?
11. A bicycle suit at $6.70?
12. Repairing bicycle, $4.70?
13. A boy went to the bank to get change, at various times, for the following amounts. How many of each piece of money might be given him?
14. A twenty-dollar bill so as to get five-dollar bills, one-dollar bills and half dollars?
15. A ten-dollar bill, so as to get two-dollar bills, one-dollar bills, half dollars and quarters?
16. A five-dollar bill, so as to get dollars, half dollars, quarters and dimes?
17. A two dollar bill, so as to get half dollars and dimes?
18. A one-dollar bill, so as to get quarters, dimes, nickels and pennies?
19. A half dollar, so as to get dimes, nickels and pennies?
20. A quarter, so as to get pennies, nickels and any other coin that he could get?

24 sheets = one quire. 20 quires = one ream.

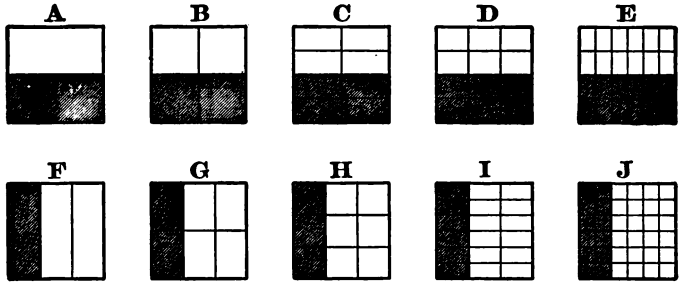
1. How many sheets in $\frac{1}{2}$ a quire? In $\frac{3}{4}$ of a quire?
2. How many sheets in $\frac{1}{3}$ of a ream? In 2 reams?
3. How many quires in 72 sheets? In 96 sheets? In 240 sheets?
4. What is the cost of a quire of paper at 2¢ a sheet?
5. What is the cost of a ream of paper when bought at 3 sheets for 1¢?
6. A man bought 1 box of paper containing 2 quires and another containing 5 quires. How many sheets of paper did he get?
7. If 12 sheets of paper cost 5¢, what is the cost of a ream at the same rate?
8. I paid $1.20 for a ream of paper. What was the cost of $\frac{1}{2}$ a quire?
9. How many boxes will hold a ream of paper if each box contains $1\frac{1}{3}$ quires? $1\frac{1}{4}$ quires?
10. A man bought paper at $1.50 a ream and sold it at 12 sheets for 5¢. How much did he gain?
11. A man bought paper at $2.75 a ream and sold it at 20¢ a quire. What was his gain? If he had paid $3 a ream and sold it at 25¢ a quire, how much more would he have gained?
12. A ream of paper is divided into 40 equal parts. What part of a quire is each?
13. From 3 reams of paper $1\frac{1}{4}$ reams were sold at one time and 3 quires at another time. How many sheets remained? How many quires? What part of a ream?
14. After collecting damaged lots of paper, a man found he had 18 quires and 10 sheets of one kind, 11 quires and 5 sheets of another kind, and 10 quires and 5 sheets of a third kind. He sold it at $1.25 a ream. What did he get for all?

1. A man leaves his home each week day at 8.11 in the morning and reaches his office at 8.27. He returns in the evening, leaving his office at 5.45 and reaching his home at 6.01. How many hours does he spend on the way in a week? In the month of January, if there are 4 Sundays in a month?
2. A teacher leaves her home each morning at 8.20 and reaches the school-house at 8.47. She returns, leaving the school-house in the evening at 3.43 and reaching her home at 4.05. How many hours does she spend on the way in 4 weeks? How many hours in the school year if there are 38 weeks of school in a year?
3. How far does she travel in 4 weeks if the school-house is $\frac{7}{8}$ of a mile from her home? How far does she travel in a school year of 40 weeks?
4. A train leaves St. Louis at 11.31 in the evening and reaches Chicago at 8 o'clock in the morning. It stops 11 minutes at stations on the way. What is the actual running time from St. Louis to Chicago?
5. A train leaves Chicago at 9 o'clock in the evening and arrives in St. Louis at 7.28 the next morning. Another train leaves Chicago at 11.30 in the evening, reaching St. Louis at 8.04 next morning. In how much less time does one train run than the other, and which is the faster train?
6. A train leaves Chicago at 6.30 in the evening and reaches Omaha at 8.15 next morning. If 23 minutes are spent in stopping at stations, what is the actual running time from Chicago to Omaha?
7. A second train leaves Chicago at 10.30 in the evening and reaches Omaha at 4 o'clock the next afternoon. How much longer is this train on the way than the one which left Chicago at 6.30?

1. If a block containing 3 A. is 20 rods wide, how long is it? If it contains 10 lots, how many square rods in each?
2. A lot cost $200, the house cost $12\frac{1}{2}$ times as much as the lot, and the fence $\frac{1}{2}$ as much as the lot. What did the house and the fence together cost?
3. The battle of Lexington was fought April 19th, 1775. How many Aprils have there been from then to the present day?
4. The buildings for the Columbian Exposition were dedicated October 12th, 1892. How many years, months and days since then?
5. Nathaniel Hawthorne was born July 4th, 1809, and Texas was admitted to the Union July 4th, 1845. What was Hawthorne's age in months, when Texas became a state?
6. Daniel Webster was born January 18th, 1782, and James A. Garfield was born November 19th, 1831. How old was Webster when Garfield was born?
7. Memorial Day was first celebrated by order of John A. Logan, May 30th, 1868, and he was then 42 years, 3 months and 21 days old. When was he born?
8. Gen. Grant was born April 27th, 1822, and was 41 years, 2 months and 7 days old when Vicksburg, Miss., was captured. When did he capture Vicksburg?
9. Gen. Wm. T. Sherman was born Feb. 8th, 1820, and finished his great march through Georgia December 13th, 1864. How old was he on that day?
10. Gen. Sheridan was born March 6th, 1831, and made his famous ride from Winchester to the battlefield at Cedar Creek, October 19th, 1864. What was his age then?
11. The area of Illinois is 56,650 square miles and the area of the Philippine Islands is 114,326 square miles. How much more than twice as large as Illinois are the Philippines?

1. A grain dealer bought 25,000 bu. of wheat at 97¢ per bushel, and after 3 months sold it for $1.12 per bu. He paid storage charges at the rate of ½¢ per bu. each month. What was his gain?
2. A grain elevator holds 800,000 bu. If it is kept full for 6 months, what will storage charges amount to at ¼¢ per bu. each month?
3. Six vessels carry 800,000 bu. of grain from Chicago to Buffalo. If 2 of them carry 160,000 bu. each, what is the average load of the other four?
4. Wheat weighs 60 lbs. to the bushel. What is the weight in T. of 160,000 bu.? In cwt.?
5. At 6¢ per cwt. what does it cost to ship 120,000 bu. of wheat from Chicago to Buffalo?
6. An elevator containing 645,000 bu. of grain caught fire and the grain was damaged. The grain was worth 87¢ per bu. and was insured for $250,000. What was the loss?
7. The owner of the grain, after receiving the insurance money, sold the damaged grain for feed at 13¢ per bushel. What was his actual loss?
8. Corn weighs 56 pounds to the bushel. How many car loads of 15 tons each will fill a vessel that can carry 90,000 bu.?
9. At 10¢ per hundredweight, what will it cost to ship 90,000 bu. of corn from Chicago to New York City?
10. A vessel owner agrees to carry 125,000 bu. of corn for $3750. How much does he receive per hundredweight?
11. A builder received $127.25 for making some repairs to a house. He pays his 2 helpers $2.50 each per day for the 12 days needed to do the work. What is his own share of the money?

1. How many caps worth $33\frac{1}{3}¢$ each, can be bought for \$15? For \$24?
2. If the price of bread is raised from $5¢$ to $6¢$ per loaf, how much more will 700,000 loaves cost?
3. If a barrel of flour will make 196 loaves of bread, how many barrels are required to make 700,000 loaves?
4. A rapid-fire gun shoots 100 shells per minute, how many shells will 7 such guns shoot at the same rate in $\frac{1}{2}$ a minute? In $1\frac{1}{2}$ minutes?
5. If each shell weighs 1 lb., how many guns will it take to fire a ton of shells in 1 minute?
6. If each shell uses up 6 ounces of powder, how much powder will be used by 15 guns in 1 minute?
7. A man earning \$1.20 per day works 11 days in January, 17 days in February, 28 days in March, and 25 days in each of the next three months. How much does he earn in the six months?
8. A man working for \$12 per week puts in $\frac{1}{4}$ of a day overtime each day, for which he receives double pay. How much does he earn in 4 weeks if he works every working day?
9. What will the bricks for a wall 39 ft. high cost at \$5.25 per thousand, if one thousand bricks will carry up the wall 6 in.?
10. A brick mason earning $50¢$ per hour, works 7 hours on Monday, 5 hours on Tuesday, and full time — 8 hours a day — for the rest of the week. What is his pay for the week?
11. A gang of 20 men digging for a foundation are stopped by rain from half past 9 to a quarter past 10 o'clock. If they are working for $20¢$ per hour each, how much pay does each one lose? How much would they all lose at $25¢$ per hour?



1. Into how many parts is A divided, and what is one part called?
2. How many parts, and what is one called, in B? C? D? E? F? G? H? I? J?
3. One part of A equals how many parts of B? C? D? E? G? I? J?
4. One part of F equals how many parts of G? H? I? J? D? E?
5. The number below the line of a fraction is the denominator, and indicates into how many equal parts anything is divided. Thus, as one of the parts of B is $\frac{1}{4}$, the denominator, $_4$, shows that B is divided into 4 equal parts; as one part of G is $\frac{1}{6}$, the denominator, $_6$, shows that G is divided into 6 equal parts; etc.
6. The number above the line is the numerator, and indicates how many parts are taken. Thus, in $\frac{2}{4}$ of B, the numerator, ^{2}, shows that 2 of the 4 equal parts are taken; in $\frac{2}{6}$ of G, the numerator, ^{2}, shows that 2 of the 6 equal parts are taken; etc.
7. What is the sum of $\frac{1}{2}$ and $\frac{1}{4}$? $\frac{1}{2}$ and $\frac{1}{8}$? $\frac{1}{2}$ and $\frac{1}{24}$? $\frac{1}{2}$ and $\frac{1}{6}$? $\frac{1}{2}$ and $\frac{1}{18}$?
8. How did you add $\frac{1}{2}$ and $\frac{1}{8}$?
9 It has already been seen that fractions, in order to be added, must have the same denominator.

1. Can you add $\frac{1}{2}$ and $\frac{1}{3}$?
2. In $\frac{1}{2}$ there are how many $\frac{1}{6}$'s? In $\frac{1}{3}$ there are how many $\frac{1}{6}$'s?
3. How many $\frac{1}{6}$'s are there in $\frac{1}{2}$ and $\frac{1}{3}$ together?
4. What is the difference between $\frac{1}{2}$ and $\frac{1}{4}$?
5. What is the difference between $\frac{1}{2}$ and $\frac{1}{6}$?
6. What is the difference between $\frac{1}{3}$ and $\frac{1}{6}$?
7. What is the difference between $\frac{1}{2}$ and $\frac{1}{3}$?
8. What is the sum of $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{6}$?
9. What is the sum of $\frac{1}{3}$, $\frac{1}{6}$ and $\frac{1}{8}$?
10. What is the sum of $\frac{1}{3}$ and $\frac{1}{9}$?
11. What is the sum of $\frac{1}{6}$ and $\frac{1}{9}$?
12. What is the sum of $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{9}$?
13. What is the difference between $\frac{1}{2}$ and $\frac{1}{9}$?
14. What is the difference between $\frac{1}{3}$ and $\frac{1}{8}$?
15. What is the difference between $\frac{1}{2}$ and $\frac{3}{8}$? Between $\frac{2}{3}$ and $\frac{1}{2}$? Between $\frac{3}{4}$ and $\frac{1}{2}$? Between $\frac{5}{8}$ and $\frac{1}{4}$? Between $\frac{5}{6}$ and $\frac{1}{3}$?
16. If $\frac{3}{4}$ of a yard of ribbon costs $21¢$, what is the cost of $\frac{1}{4}$ of a yard? The cost of $\frac{1}{2}$ of a yard equals what part of the cost of $\frac{3}{4}$ of a yard?
17. John worked $\frac{1}{2}$ of the day Monday, $\frac{3}{4}$ of the day Tuesday, and $\frac{1}{3}$ of the day Wednesday. How many days did he work altogether?
18. A girl having $\frac{3}{4}$ of a yard of ribbon bought $\frac{1}{8}$ more. What part of a yard had she then?
19. If from $\frac{7}{8}$ of a gallon of milk $\frac{1}{4}$ of a gallon is taken, what part of a gallon is left?
20. A boy studied $1\frac{1}{2}$ hours Monday, $1\frac{1}{4}$ hours Tuesday, and $1\frac{7}{8}$ hours Wednesday. How long did he study during the three days? How much longer Monday than Tuesday? How much longer Wednesday than either Monday or Tuesday?

1. If $\frac{2}{3}$ of a yard of cloth cost \$.96, how much will $\frac{1}{6}$ of a yard cost?
2. A girl walked $\frac{2}{3}$ of a mile, and after resting walked $\frac{1}{6}$ of a mile farther. What part of a mile did she walk in all?
3. A man traveled $1\frac{1}{6}$ miles east, returned, and then went $\frac{1}{2}$ a mile west. How far did he travel?
4. From a piece of cloth $24\frac{2}{3}$ yds. long, $6\frac{1}{3}$ yds. were sold to one customer and $8\frac{1}{6}$ yds. to another. How many yards remained?
5. One box weighs $5\frac{1}{2}$ lbs., a second box, 3 times as much as the first, and a third, $\frac{1}{2}$ as much as the second. What is the weight of the second and the third box?
6. A family uses $3\frac{1}{2}$ cwt. of ice one week, $2\frac{1}{3}$ cwt. the next week. How much do they use in the 2 weeks?
7. How many jars holding $\frac{1}{3}$ of a gal. each can be filled from $3\frac{2}{3}$ gals. of water?
8. A boy attends school $\frac{5}{6}$ of the yr.; $\frac{1}{2}$ of his vacation is spent in the country. What part of the year does he spend in the country?
9. A grocer having $4\frac{1}{2}$ crates of berries sold $\frac{3}{4}$ of them. How many had he left?
10. A milkman sells $\frac{3}{4}$ of a pt. of cream and $1\frac{1}{2}$ qts. of milk a day to each of 2 families. How much cream does he sell to both in four days? How much milk?
11. One girl was absent from school $\frac{1}{3}$ of a month; another girl was absent $\frac{1}{2}$ as long. What part of the month was the second girl absent?
12. How many bean bags, each requiring $\frac{1}{8}$ of a yd. of cloth, can be made from $\frac{1}{4}$ of a yd.? From $\frac{1}{2}$ a yd.? From $\frac{3}{4}$ of a yd.? $\frac{7}{8}$ of a yd.?
13. A man when traveling spent $\frac{3}{4}$ of a yr. in England; $\frac{1}{3}$ of a yr. in France, $\frac{1}{6}$ of a yr. in Germany, and $\frac{3}{4}$ of a yr. in Italy. How many yrs. in all?

1. A woman bought $4\frac{1}{2}$ qt. of berries, $3\frac{1}{4}$ qt. of currants, and $2\frac{1}{8}$ qt. of cherries. How many quarts of fruit did she buy?
2. In making a garden, a man planted $\frac{1}{4}$ A. in cabbages, $\frac{1}{8}$ A. in peas, $\frac{1}{16}$ A. in beans, and $\frac{1}{32}$ A. in tomatoes. How much land did he plant in all?
3. A girl spent $\frac{1}{3}$ of the summer in the country, $\frac{2}{9}$ of it in the mountains, and the rest of it at home. What part of the summer was she at home?
4. While canning peaches, a woman cut 12 peaches into halves and 12 into thirds. How many halves were there? How many thirds? How many more thirds than halves? How many thirds equal four halves? Six halves? Eight halves? Ten? Twelve?
5. A man traveled $\frac{1}{3}$ of a certain distance by boat, $\frac{4}{9}$ by train, and walked $\frac{1}{2}$ the remaining distance. What part of the distance did he walk?
6. From a lot of $5\frac{1}{2}$ doz. pairs of shoes, $2\frac{1}{2}$ doz. were sold at one price, and the rest at another price. How many dozen were sold at the second price?
7. A man built $4\frac{1}{2}$ yd. of fence one day and $1\frac{1}{16}$ yd. less the next. How many yards did he build the second day?
8. The area of a building was $30\frac{1}{4}$ sq. yd.; an addition $\frac{1}{3}$ as large as the building, was made. What was the area of the addition?
9. How many square feet of tile will be needed for the floors of two rooms, each containing $18\frac{1}{6}$ sq. ft.?
10. A boy spent $\frac{3}{4}$ of every year at college, for 4 years. How much time did he spend there in all?
11. A carpenter bought 528 ft. of lumber, used $\frac{1}{4}$ of it, sold $\frac{1}{3}$ of the remainder, and stored what was left. What part did he sell? What part did he keep? How many feet did he keep?

1. Add 3 yd. 2 ft. 8 in., 4 yd. 1 ft. 4 in., and 3 yd. 2 ft. 6 in.

rd.	yd.	ft.	in.
	3	2	8
	4	1	4
	3	2	6
2	1	0	6
		2	1

Write the numbers in columns, putting *in.* under *in.*, *ft.* under *ft.*, etc.

Add the first right hand column which gives 18 in. But 18 in. = 1 ft. and 6 in. Write the 6 in its column and add the 1 ft. to the sum of the column of feet, which gives 6 ft. = 2 yd.

Write a cipher in the column of ft. and add the 2 yd. to the sum of the column of yd., which gives 12 yd. = 2 rd. and 1 yd.

2. Subtract 2 yd. 2 ft. 8 in. from 4 yd. 1 ft. 10 in.

yd.	ft.	in.
4	1	10
2	2	8
1	2	2

Write the numbers as in addition, and subtract; 10 in. − 8 in. = 2 in.

2 ft. cannot be subtracted from 1 ft., so change 4 yd. and 1 ft. to 3 yd. and 4 ft., and then subtract.

3. Multiply 1 yd. 2 ft. 5 in. by 3.

yd.	ft.	in.
1	2	5
		3
5	1	3
	2	1

Multiplying through we get 3 yd. 6 ft. and 15 in., which when reduced is 5 yd. 1 ft. 3 in.

4. Divide 7 yd. 2 ft. 8 in. by 2.

3	2	10
2)7 yd.	2 ft.	8 in.
6		
1 =	3	
	5	
	4	
	1 =	12
		20

Notice that the quotient is placed above the dividend, each unit in its proper column.

The division is made as usual, the remainder being changed to the next lower unit and added to the number in that column. Then proceed as before.

1. Add 12 sq. yd., 4 sq. ft., 120 sq. in.; 4 sq. yd., 7 sq. ft., 20 sq. in.; 6 sq. yd., 9 sq. ft, 16 sq. in.; 7 sq. ft., 4 sq. in.
2. Add 4 cu. yd., 9 cu. ft., 1200 cu. in.; 3 cu. yd., 400 cu. in.; 4 cu. ft., 600 cu. in.; 5 cu. yd., 12 cu. ft.
3. Add 15 gal., 3 qt., 1 pt., 3 gi.; 4 gal. 2 qt.; 6 qt., 1 pt., 2 gi.; 9 gal., 1 pt., 3 gi.
4. Add 3 bu., 3 pk., 7 qt., 1 pt.; 4 bu., 2 pk., 6 qt.; 3 pk., 4 qt., 1 pt.; 3 bu., 1 pk., 6 qt.; 1 pk., 2 qt., 1 pt.
5. Add 2 T., 16 cwt., 80 lb., 8 oz.; 1 T., 8 cwt., 15 lb., 6 oz.; 3 T., 10 cwt., 50 lb., 8 oz.; 18 cwt., 90 lb., 4 oz.
6. Add 4 hr., 45 min., 15 sec.; 6 hr., 30 min.; 55 min., 45 sec.; 3 hr., 30 sec.
7. Subtract 16 sq. yd., 7 sq. ft., 44 sq. in., from 24 sq. yd., 5 sq. ft., 120 sq. in.
8. Subtract 3 cu. yd., 9 cu. ft., 680 cu. in., from 12 cu. yd., 6 cu. ft., 1240 cu. in.
9. Subtract 1 gal., 3 qt., 1 pt., 3 gi., from 4 gal., 2 qt., 1 pt., 1 gi.
10. Subtract 2 bu., 2 pk., 5 qt., 1 pt., from 6 bu., 3 pk., 4 qt., 1 pt.
11. Subtract 2 T., 15 cwt., 15 lb., 9 oz., from 4 T., 12 cwt, 20 lb., 8 oz.
12. Multiply 9 cu. yd., 8 cu. ft., 640 cu. in., by 4.
13. Multiply 6 gal., 3 qt., 1 pt., 3 gi., by 5.
14. Multiply 5 bu., 3 pk., 7 qt., by 2.
15. Multiply 2 T., 10 cwt., 60 lb., 12 oz., by 3.
16. Multiply 4 hr., 40 min., 30 sec., by 5.
17. Divide 16 sq. yd., 3 sq. ft., 141 sq. in., by 3.
18. Divide 19 cu. yd., 1 cu. ft., 216 cu. in., by 9.
19. Divide 26 gal., 3 qt., 2 gi., by 6.
20. Divide 12 bu., 1 pk., 3 qt., by 5.
21. Divide 12 T., 3 cwt., 50 lb., by 10.

1. A train traveled 32 mi., 120 rd., 7 yd., one hour, and 30 mi. 160 rd., 4 yd., the next. How far did it travel in the two hours?
2. A man built 4 yd., 1 ft., 8 in., of walk at one time, and 3 yd., 2 ft., 6 in., at another. How much did he build?
3. One field contains 6 A., 80 sq. rd., and 40 sq. yd.; the field beside it contains 14 A., 120 sq. rd, $20\frac{1}{2}$ sq. yd. If the fields are joined into one, how much land will it contain?
4. A building whose area is 30 sq. yd., 6 sq. ft., 72 sq. in., is enlarged by an addition whose area is 9 sq. yd., 8 sq. ft., 72 sq. in. What is the area of the entire building?
5. One room contains 185 cu. yd., 7 cu. ft., 192 cu. in. of air; another 172 cu. yd., 4 cu. ft., 432 cu. in.; a third 864 cu. yd., 2 cu. ft., 192 cu. in. If the air in all the rooms is entirely changed once every hour, how much air will be required in 1 hour?
6. Before buying, a grocer had 2 gal., 2 qt., 1 pt. of vinegar; he purchased 7 gal., 3 qt., 1 pt. more. How much had he then?
7. A farmer raised 56 bu., 3 pk. of Irish potatoes, and 24 bu., 2 pk. of sweet potatoes. How many had he in all?
8. One family used 1 T. 13 cwt. 50 lb. of ice in one summer, another family used 1 T. 9 cwt. 75 lb. How much did they both use?
9. A steamship made the first half of a trip in 6 d. 10 hr. 45 min. and the return trip in 7 d. 3 hr. 15 min. If 2 d. 6 hr. 30 min. were spent in port before returning, in what time did the ship make the entire trip?
10. A boy rode 10 mi. 80 rd. 4 yd. in 1 hour, and 2 mi. 120 rd. 3 yd. less the next hour. How far did he ride the second hour?

1. A man owning a farm of 740 A. and 78 sq. rd. sold 290 A. and 98 sq. rd. How large was his farm then?
2. In a bin holding 7 cu. yd. 9 cu. ft. 576 cu. in. a partition was placed separating a part holding 3 cu. yd. 18 cu. ft. 1152 cu. in. What were the contents of the remaining part?
3. From a cistern holding 10 bbl. 14 gal. 1 qt. of water, a quantity was taken out, leaving 2 bbl. 8 gal. 3 qt. in the cistern. How much was taken out?
4. A grocer bought 12 bu. 1 pk. of potatoes and 4 bu. 3 pk. less of apples. How many apples did he buy?
5. From a load of grain weighing 2 T. 14 cwt. 30 lb., 1 T. 18 cwt. 80 lb. were removed. What was the weight of the remaining part?
6. One train made a trip in 14 hr. 15 min. 25 sec.; another train made the same trip in 1 hr. 50 min. 45 sec. less time. In what time was the trip made by the second train?
7. Two boats left the same port at the same time, one sailed 21 mi. $5\frac{1}{2}$ yd. while the second sailed twice as far. How far did the second one sail?
8. A building whose area was 27 sq. yd. 3 sq. ft. 72 sq. in. was torn down and another built whose area was three times that of the old one. What was the area of the new building?
9. In digging a cellar, 24 cu. yd. 3 cu. ft. 576 cu. in. of earth were excavated; it was then determined to make the cellar three times as large. How much more earth was removed? How much in all?
10. A book dealer shipped 3 boxes of books. One weighed 1 cwt, 90 lb., 8 oz.; the second weighed twice as much as the first, and the third as much as both the others together. What was the weight of each?

(COPY OF BILL.)

Chicago, June 1, 1898.

Albert Miller,

Bought of JOHN SAMPLE, BOOKSELLER

3	Books	@ .35	$1	05
2	Tablets	@ .10		20
4	Pencils	@ .05		20
		Total	1	45

(COPY OF RECEIPTED BILL.)

Chicago, Dec. 23, 1897

Miss Edna Lane,

Bought of PRINCE'S TOY STORE

2	Dolls	@ .69	$1	38
3	Sets Toy Dishes	@ .87	2	61
1	Music Box		1	35
$1\frac{1}{2}$	Doz. Xmas Cards	@ .54		81
	Total		6	15

Received Payment,
Prince's Toy Store.

Copy, find amounts due on the following accounts, and receipt.

J. MANNING,

In account with D. L. PARMER, Dr.

1898.

Jan.	2	To 75 lbs. Rice	@	$ .04		
"	2	" 330 lbs. Sugar	@	.05		
"	7	" 50 lbs. Java Coffee	@	.32		
"	7	" 45 lbs. Tea	@	.60		
		Amount due, - - -				

JAMES GILMAN,

In account with GEO. JOHNSON, Dr.

1898.

May	6	To 5 Days' Work	@	$2.50		
"	13	" 12 lbs. Nails	@	.03		
"	14	" 7 Panes of Glass	@	.40		
June	11	" 10 gals. Paint	@	1.00		
"	18	" Job Work on House			275	00
		Amount due, - - -				

1. Make bills for the following:

Feb. 4, Mrs. J. K. Brown bought of White, Jones & Co.:

10	lbs. of Sugar	@	$.05
20	" Flour	@	.04
2	" Tea	@	.60

Jan. 11, L. B. Hall bought of Smith Bros.:

20	pr. Boys' Boots	@	$1.75
15	" Slippers	@	1.50
25	" Ladies' Shoes	@	2.75
25	" Rubbers	@	.50

June 4, Messrs. Black & Co. bought of Marshall Field & Co.:

3	bolts of Velvet	@	$100.00
3	" Muslin	@	37.00
2	" Calico	@	10.00

May 5, L. French bought of Browne, Steele & Co.:

5	yds. of Silk	@	$1.75
3	" Ribbon	@	.75
12	" Gingham	@	.12
7	" Velvet	@	4.50
15	" Calico	@	.05
4	papers Pins	@	.07
2	" Needles	@	.08

Sept. 1, J. C. Hill bought of Birch & Son:

8	Histories	@	$1.25
15	Spellers	@	.25
9	Readers	@	.40
12	Grammars	@	.60
20	Arithmetics	@	.55

Oct. 21, O. F. Horn bought of Taylor & Co.:

5	Coal Stoves	@	$20.00
10	Oil Stoves	@	8.00
25	lbs. Nails	@	.04

1. Make out bills, supplying names, find the amounts, and receipt:

9 lbs. of Ham	@	$.16
8 " Veal	@	.12
12 " Mutton	@	.12½
16 " Beef	@	.14
4 " Pork	@	.08⅓
13 lbs. of Dried Beef	@	$.12
25 " Codfish	@	.11
16 " Mackerel	@	.06¼
18 " Bacon	@	.12½
30 yds. of Cassimere	@	$1.75
70 Spools Thread	@	.03½
64 yds. Sheeting	@	.12
45 " Calico	@	.04
5 Table Cloths	@	2.50
112 bbl. Flour	@	$ 6.20
108 tons of Hay	@	14.00
250 bu. Wheat	@	.92
130 " Corn	@	.32½
75 " Barley	@	.85
12 doz. Eggs	@	$.12½
12 lbs. Rice	@	.04
48 " Coffee	@	.33⅓
15 " Butter	@	.22
32 " Cheese	@	.14
6 rolls of Wall Paper	@	$.20
8 qts. Paint	@	.30
6 " Oil	@	.15

1. What part of a dollar is 50¢? 25¢? 10¢? 1¢?
2. How do you write 1¢ as a fraction of a dollar? How do you write it with the dollar sign ($)?
3. How do you write 10¢ as a fraction of a dollar? With the dollar sign?
4. How do you write 25¢ as a fraction of a dollar? With the dollar sign? 50¢ as a fraction of a dollar? With the dollar sign?

   $.01 = $\frac{1}{100}$ of a dollar.

   .10 = $\frac{10}{100}$ (or $\frac{1}{10}$) of a dollar.

   .25 = $\frac{25}{100}$ of a dollar.

   .50 = $\frac{50}{100}$ of a dollar.
5. The period used between figures when writing dollars and cents is called the decimal point.
6. It is much easier to write cents with the decimal point than as fractions of a dollar.

   1¢ = $\frac{1}{100}$ of a dollar = .01 of a dollar.

   10¢ = $\frac{10}{100}$ (or $\frac{1}{10}$) of a dollar = .10 (or .1) of a dollar.

   25¢ = $\frac{25}{100}$ of a dollar = .25 of a dollar.

   50¢ = $\frac{50}{100}$ (or $\frac{5}{10}$) of a dollar = .50 (or .5) of a dollar.
7. Numbers when written with the decimal point are read exactly as when written as fractions.

   $\frac{1}{100}$ of a dollar is read *one-hundredth* of a dollar.

   .01 of a dollar is read *one-hundredth* of a dollar.

   $\frac{1}{10}$ of a dollar is read *one-tenth* of a dollar.

   .1 of a dollar is read *one-tenth* of a dollar.

   $\frac{25}{100}$ of a dollar is read *twenty-five-hundredths* of a dollar.

   .25 of a dollar is read *twenty-five-hundredths* of a dollar.

   $\frac{5}{10}$ of a dollar is read *five-tenths* of a dollar.

   .5 of a dollar is read *five-tenths* of a dollar.
8. From this it is seen that the first figure following the decimal point is read as *tenths;* the second figure as *hundredths.*

1. Read the following numbers as parts of a dollar:

.05	.45	.23	.3
.6	.93	.8	.44
.18	.06	.75	.02
.72	.15	.9	.12

2. When fractions are written in the common way, by using the line, as $\frac{1}{10}$, they are called *Common Fractions;* when written in this new way, by using the decimal point, as .1, they are called *Decimal Fractions.*

3. Fractions of anything else as well as of money, when having the denominators 10 or 100, may be written with the decimal point. Thus:

$\frac{1}{10}$ of a bu. = .1 of a bu.

$\frac{25}{100}$ of a T. = .25 of a T.

4. Write as decimal fractions the following:

$\frac{94}{100}$	$\frac{4}{10}$	$\frac{15}{100}$	$\frac{6}{100}$
$\frac{7}{10}$	$\frac{86}{100}$	$\frac{9}{100}$	$\frac{6}{10}$
$\frac{18}{100}$	$\frac{19}{100}$	$\frac{9}{10}$	$\frac{2}{100}$
$\frac{6}{10}$	$\frac{5}{10}$	$\frac{12}{100}$	$\frac{2}{10}$

5. A boy spent .25 of a dollar; how many cents did he spend?

.01 of a dollar = 1¢.

.25 of a dollar = 25 × 1¢ = 25¢.

6. From a flock of 350 sheep a farmer sold .3 of them. How many did he sell?

7. A piece of cloth 10 yd. long was sold to two customers, one buying .5 of it, the other buying the rest. How many yards did each one take?

8. A boy traveled 100 miles, going .2 of the way by boat. How many miles did he go by boat?

9. From a cistern holding 500 gal., .07 of its contents were drawn off. How many gallons were drawn off?

10. A man bought .75 of a quantity of grain measuring 400 bu. How many bu. did he buy?

1. In one dollar how many cents?
2. What part of one dollar is 1 cent? 12 cents? 23 cents?
3. Another term for hundredths is *per cent.*
   15 hundredths of a dollar = 15 per cent of a dollar.
   7 hundredths of a dollar = 7 per cent of a dollar.
4. Instead of the word per cent, the sign % is often used.
   15% of a dollar = 15 per cent, or hundredths, of a dollar.
   7% of a dollar = 7 per cent, or hundredths, of a dollar.
5. Since anything may be divided into 100 equal parts, any number of such parts may be called so many hundredths or per cent.
   $\frac{15}{100}$ of a bu. = 15% of a bu.
   $\frac{7}{100}$ of a bu. = 7% of a bu.
6. Since 15% is the same as $\frac{15}{100}$, it may be written as a decimal fraction exactly as $\frac{15}{100}$ may be written decimally, .15; 7%, the same as $\frac{7}{100}$ may be written .07.
7. Write first with per cent sign, then as decimal fractions:

$\frac{8}{100}$	$\frac{6}{100}$	$\frac{13}{100}$	$\frac{33}{100}$
$\frac{40}{100}$	$\frac{18}{100}$	$\frac{14}{100}$	$\frac{12}{100}$
$\frac{25}{100}$	$\frac{20}{100}$	$\frac{50}{100}$	$\frac{16}{100}$
$\frac{75}{100}$	$\frac{60}{100}$	$\frac{45}{100}$	$\frac{66}{100}$

8. Write first as common, and then as decimal fractions:

10%	25%	64%	$12\frac{1}{2}$%
15%	20%	53%	$33\frac{1}{3}$%
3%	50%	2%	$16\frac{2}{3}$%
5%	75%	45%	$66\frac{2}{3}$%

9. Write as common fractions:

.8	.25	.7	.09
.5	.14	.04	.85
.16	.75	.65	.01
.33	3.1	2.25	1.03

1. Review pages 190 and 226.
2. How many cents in $\frac{1}{4}$ of a dollar? In $\frac{1}{2}$ of a dollar? $\frac{3}{4}$ of a dollar? $\frac{1}{8}$ of a dollar? $\frac{5}{8}$ of a dollar? $\frac{7}{8}$ of a dollar?
3. What per cent of a dollar is $\frac{1}{4}$ of a dollar? $\frac{3}{4}$? $\frac{1}{2}$? $\frac{1}{8}$? $\frac{5}{8}$? $\frac{3}{8}$? $\frac{7}{8}$?
4. Instead of one dollar, find the same parts and per cents of one gallon. One bushel. Of any unit. Of \$8. Of \$24. Of 40 marbles. Of 84 acres.
5. 25% of any number is $\frac{1}{4}$ of the number.
6. Make similar statements regarding the other per cents used.
7. How many cents is $\frac{1}{6}$ of a dollar? $\frac{5}{6}$ of a dollar? $\frac{1}{3}$ of a dollar? $\frac{2}{3}$ of a dollar?
8. What per cent of a dollar is $\frac{1}{6}$ of a dollar? $\frac{5}{6}$ of a dollar?
9. Instead of one dollar, find $\frac{1}{6}$ and $\frac{5}{6}$ of one yard. Of one foot.
10. What per cent of a foot is $\frac{1}{6}$ of a foot? $\frac{5}{6}$ of a foot? $\frac{1}{3}$ of a foot? $\frac{2}{3}$ of a foot?
11. What per cent of a yard is $\frac{1}{6}$ of a yard? $\frac{5}{6}$ of a yard? $\frac{1}{3}$ of a yard? $\frac{2}{3}$ of a yard?
12. Find $16\frac{2}{3}\%$ of 18 pigeons. Of 24 marbles. Of 30 boys. Find $83\frac{1}{3}\%$ of the same. $33\frac{1}{3}\%$. $66\frac{2}{3}\%$.
13. $33\frac{1}{3}\%$ of 12 is 4. $\frac{1}{4}$ of 12 is 4. $33\frac{1}{3}\%$ of 12 and $\frac{1}{3}$ of 12 are the same.
14. Make statements about the other per cents.
15. 50% of Fred's money is 15 cents. How much money has he?
16. 75% of the milk one family uses in a week is 8 quarts. How much milk is used? What part of the quantity used is 8 qts.?
17. $33\frac{1}{3}\%$ of the horses in a livery stable is 21. How many horses in all? What part of the whole number of horses is 21 horses?

1. $16\frac{2}{3}\%$ of my pens is 42. How many pens have I? 42 pens is what part of the whole number?
2. A boy lost $16\frac{2}{3}\%$ of his marbles, and had 30 marbles left. What part was lost? How many were lost? How many had he at first?
3. In an orchard of 156 trees, $16\frac{2}{3}\%$ are pear, and $83\frac{1}{3}\%$ are apple. What part of the whole number of trees is pear? Apple? How many of each?
4. A man bought a bicycle for \$54 and sold it so as to gain 25%. What was the selling price?
5. $87\frac{1}{2}\%$ of the butter in a dairy is 84 pounds. What is the whole number of pounds? If sold at 23 cents per pound, how many dollars will the dairyman receive?
6. A stock dealer sold $12\frac{1}{2}\%$ of his horses and had 42 left. How many had he at first? How many were sold? If each horse sold for \$85, how much money did the dealer receive?
7. A milkman sold 24 gallons of milk on Tuesday, which was 25% less than the number sold on Monday. What part of Monday's sale was Tuesday's? How many gallons were sold on Monday?
8. Review 1, 2, 3, 4, page 264.
9. 1% (.01) of \$100 = \$1. 1% of any 100 = 1.
10. 1% of 200 = how much? 1% of 300 = how much?
11. Find 5% of 200.
    1% (.01) of 200 = 2.
    5% = 5 × 2, or 10.
12. In the same way find 3%, 4%, 5%, 6%, 7%, 8%, 9% of 200.
13. Find 4% of 90; 6% of 80; 9% of 30.
14. Find 10% of 400; 20% of 500; 35% of 200.
15. Find 25% of 600; 50% of 250; 75% of 800.
16. In what other and shorter way may we find 25%, 50% and 75% of numbers?

1. A man invested $500 in business and gained 7% on his money the first year. What was his gain?
2. Of 862 feet of lumber, 4% is oak. How many feet of oak?
3. In a school of 1,400 children, 15% are in the grammar grade. How many pupils in the grammar grade?
4. I have 84 marbles, and 5% of them are agates. How many agates have I?
5. 5,824 hours equal how many days?
6. A grocer sells 3,690 ounces of tea. How many pounds does he sell? What is the selling price of the whole amount at 80¢ a pound?
7. A man bought a house and lot for $2,000. After paying $75.50 a month for 18 months, how much did he still owe?
8. A man sold 25 horses at $87.36 each, and with the money bought land at $24 an acre. How many acres did he buy?
9. 23 horses were exchanged for 46 cows. The cows were valued at $45 each. What was the average value of each horse?
10. A grocer having $465 wished to buy 84 barrels of flour at $5.50 per barrel. Had he money enough to make the purchase? If more or less, how much?
11. How many rows of bricks in a chimney 64 feet high, if 3 rows measure 9 inches?
12. How many bricks in a wall 45 feet high, 93 bricks long, and 2 bricks thick, if 4 bricks measure 1 foot in height?
13. How many hours will it take to deliver 5,400 bricks if a team hauls 500 at a load, and makes one trip in $1\frac{1}{2}$ hours?
14. A bricklayer's hod holds 20 bricks. If he carries 6 hods in 54 minutes, how many hours will it take him, at the same rate, to carry 1,200 bricks?

1. A man paid \$115.20 for 144 bushels of wheat. What was the price per bushel? The wheat was sold at a gain of $12\frac{1}{2}\%$. How much was gained? What was the whole amount received? At what price per bushel was the wheat sold?
2. From a barrel containing $31\frac{1}{2}$ gal. of vinegar, there were drawn out at one time, 6 gal., 3 qt., 1 pt.; at another, 12 gal., 3 qt., 1 pt., and at another, 3 gal., 1 pt. How many gallons, quarts and pints were left in the barrel? The remainder was sold for \$2.19. What was the selling price per gallon?
3. Make out a bill for the following, as on page 261:

12	lbs. of bacon	at	$\$0.12\frac{1}{2}$
7	lbs. of ham	at	$.16\frac{2}{3}$
$3\frac{3}{4}$	lbs. of coffee	at	.40
$1\frac{1}{2}$	lb. of tea	at	.80
5	lbs. of butter	at	.22
6	doz. eggs	at	.15

What change should be received from a ten-dollar bill?

4. What will be the cost of laying a concrete walk 380 ft. long by 6 ft. wide, at $16\frac{2}{3}¢$ per sq. ft.?
5. If it costs \$418.20 to fence a block 369 feet square, what price is paid per yd.?

DEPARTMENT OF EDUCATION
LELAND STANFORD JUNIOR UNIVERSITY